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TOPOGRAPHIC NOTES ON THE URAL MOUNTAINS.

BY

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The study of mountain-regions has resulted in a classification, with regard to orographic features, of the various parts of the continents known to geographical research. This classification is justly, as it seems to the writer, based on age. Its many sub-modifications are all dependent, primarily, on the difference in length of time during which the given mountain system has been subjected to the forces of erosion and those producing elevation and depression.

The difference of climatic conditions, little or much rainfall, even or uneven and rapidly-changing temperature, may be noted in their effects by the experienced observer, who sees for the first time a given mountain-tract. He will find himself deceived, however, if he does not take into account time, the determining factor of all topographic features of large character.

Considered from a purely topographic standpoint, it may be said that the geological structure itself is subordinate in determining the resulting forms to the all-powerful control of time. Witness in this regard the gigantic masses of Mt. Fairweather and Mt. St Elias on the Alaskan coast, long taken for volcanic mountains by geographers as well as by navigators, and only by close observation and comparison determined to be of sedimentary structure. Or, the writer may cite the dome-shaped mountains seen by him during the past summer along the upper reaches of the Yenisei river, which superficially resemble bosses of plutonic rock, but which on close inspection are seen to be composed of nearly horizontal beds of Carboniferous sandstone.

Perhaps there is no more striking example, in those portions of

the earth's surface already known to investigators, of what may be called deceptive mountain topography than is presented by a study of the Ural mountains in eastern Russia. This field has been long studied from many geological and mineralogical standpoints, and from it have been drawn, in fact, in the fields of palaeontology and mineralogy important contributions to the classic nomenclature of those sciences. It is possible that contributions have also been made from this field to the literature of modern geographical study; but the writer, although not familiar with all the work which has been done by the Russian geologists in that portion of the country, feels a reasonable degree of confidence that the Ural has not been considered to any extent from the point of view taken in the present article. Over so large an area notes such as the following must necessarily be of a rather general character. As the observations recorded are, however, the result of a considerable amount of time spent in the field, it is hoped they may be found of value for the purposes of comparison with descriptions of regions better known to Americans.

From the northern

border of the Caspian Sea northward even to the Arctic Ocean extends the broad and poorly-defined series of low mountains and hills known as the Ural chain. Geologically considered, the area in question is a mountain region of the purest type. Metamorphic schists of both igneous and sedimentary origin, with accompanying dikes and laccolites of igneous rock, with every range



SKETCH MAP OF EUROPE, SHOWING LOCATION OF AREA DESCRIBED.
SCALE APPROXIMATELY 700 MILES TO 1 INCH.

in composition from the most acid to the most basic, and in structure from sharply-defined porphyritic to purely granular, present a complexity of folding whose problems it is well-nigh impossible to solve. In almost any section followed across the general north and south strike of the rocks will be found numerous

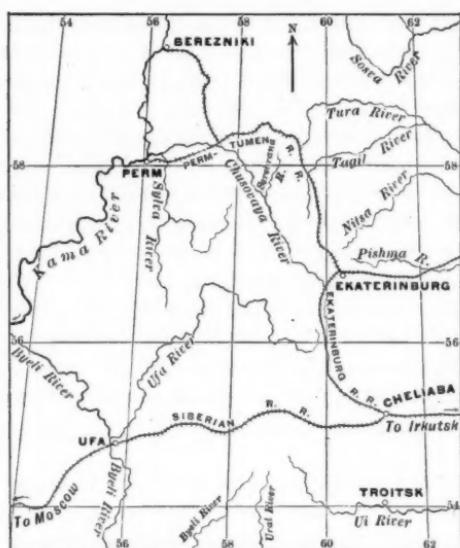
exposures of the schists, exhibiting most intricate folding and minute faulting. In the region between Kushva and Perm, for example, along the Chusovaya river and its tributaries, the extraordinary crinkling of graphitic schists is beautifully set off by the multitude of narrow veins of white quartz interleaved with the laminae of the schist. In the gold mines of Kochkar, where the underground workings afford opportunity of studying the schistose diorites in a comparatively fresh state, the sections of country-rock exposed in the cross-cuts exhibit all the complicated anticlinal and synclinal structure characteristic of mountain complexes which have been subject to severe disturbances. The saprolitic character of the surface rock interferes with the study of the orographic features in many parts of the country. Indeed it has been found in the mining districts about Troitsk that shafts have penetrated the red, decomposed clayey schists for more than 100 feet before encountering rock sufficiently hard to require a blast. In this particular the Ural region bears a striking resemblance to the southern Appalachians of the United States, and it is the more remarkable inasmuch as the climatic conditions obtaining in the two regions are so entirely different.

The observer is struck as he rides or drives about the Ural with the planed-down appearance of the hills and the entire absence of sharp or accentuated forms. The vast plains, denominated the Steppe, extending from the line of the Trans-Siberian Railroad southward to the Caspian, are, as the strict geographer would use the term, mountains, but so old as to have lost entirely the character of such. An absolute plain is not, so far as the writer knows, to be found in the region, but the Orenburg Steppe must be classed as a peneplain. It will be shown that in all probability this peneplain is not limited in extent, but is part of one great general plain hundreds of miles in length, and in places more than one hundred in width. In the vicinity of Miassky Zavod, on the line of the railway, where the washings for gold-bearing gravels have laid bare large areas of the bed-rock, the intricately folded schists are graphically mapped out on the nearly horizontal floors of the placers. The mountain-complex has been pared down as by some giant knife, and all above the last cut has disappeared. The only indestructible elements, the gold and quartz, have remained, forming a horizontal bed on the top of the edges of the schists. Judging by the comparative richness of the gold placers, and the poverty in this metal of the quartz veins now found in the schists, the mass of material from which this gold came must have been

enormous. It is safe, therefore, to infer that very high mountains have existed here, and that much time has been consumed in the process of denudation to the present level.

Evidence of a similar nature is afforded by the deposits of platinum, several hundred miles farther north, along the Iss and Tura rivers.

Although the level of the peneplain approaches in some places the present level of the streams, signs of an uplift after a nearly completed cycle of erosion are everywhere visible. Along the railroad, as, for example, near Cheliabinsk, the amount of re-cutting done by the present streams does not exceed ten or fifteen feet vertically.



SKETCH MAP OF PART OF URAL REGION, SHOWING LOCALITIES MENTIONED. SCALE 60 MILES TO 1 INCH.

Gradually. Toward the south, however, the uplift has been greater, and at the rare intervals where streams occur most striking examples of cañon-like topography are seen. The Sanarka and Ural rivers, one hundred and fifty miles to the south of Miassky Zavod, are examples of a drainage superimposed on a country in which well-defined river-courses were already carved. Measurements with barometer taken along the Ural river showed that the top of the peneplain varies in height from 50 to 200 feet above the present river-bed, the variations being due to the fact of the undulating surface of the Steppe. The main river valley is so sharply cut that, although from one cliff to that on the opposite bank the distance is really 1,000 feet, an observer standing on the surface of the peneplain at an equal distance back from the bank nearer to him would not know that there was a cut in the plain.

The undulations referred to in the preceding paragraph cannot be compared with any feature of topography found within the limits of the United States, so far as known to the writer. The

rolling prairie country of the upper Mississippi valley can hardly be likened to it, since the waves, if they may be so termed, of the prairies are regularly spaced and not of great individual magnitude. The Troitsk and Orenburg Steppe, on the other hand, may be likened, if it is permissible to use the simile of the ocean, to the sea's surface at a time when a calm has succeeded to violent winds blowing at cross-directions. Billows of land of immense proportions are interspersed with smaller ones, and it cannot be said that there is any regularity either in the size of the rolls, in their distribution, or in their distance from one another. The distance from the crest of one wave of the Steppe to that of the following is from two to four miles. Of such a quality is the atmosphere, however, that it is difficult to believe from mere observation that the distances are so great. One soon becomes convinced in travelling over the ground. The absence of any but the most scant growths of trees in the Steppe regions renders the study of the topographic forms exceedingly easy. In many places the sight is entirely uninhibited for distances of fifteen and twenty miles over the immense plains.

The nearly vertical beds of schist and slate cut off sharply at the river-bank form miniature points and promontories similar to those which the writer has seen on a larger scale along the shores of Kadiak Island, in Alaska. Between these cliffs narrow cañons penetrate the plateau for distances of a few hundred feet, occasionally much longer. These cañons of the tributaries have been partially filled with black peat or turf, which, on being closely examined, appears to be little more than compressed, decayed and finely matted vegetable material of a spongy consistency. It is dug out, cut into blocks, and dried for burning by the Kirghiz nomads who inhabit the region. They also use it for banking up the sides and roofs of their winter huts, for the sake of warmth. The turf has frequently a vertical thickness of fifty feet, and it is not easy to account for its origin in this nearly arid region, where there is so little decay of vegetable material. The occurrence would seem to imply that the orographic changes of the region have been accomplished with exceeding slowness to allow of a thick accumulation of decayed vegetable material from comparatively poor sources. For on the Steppe the extraordinary semi-tropical vegetation characteristic of the Siberian forests, and to some extent of the northern Ural, is entirely lacking, and is replaced merely by scant patches of low bushes and patches of growth similar to the American sage-brush.

On the top of the plateau a very thin layer of turf, never exceeding three feet in thickness, is distributed with considerable uniformity. Numerous reefs of quartz and occasionally a band of schist of more than usual hardness form parallel ridges, generally bare of any covering, which may be traced by the eye for long distances across the country. Pits dug through the thin blanket of turf which covers the evenly undulating surface of the Steppe have discovered a bed varying from one to two feet in thickness of fine gravel, well water-worn. This bed lies frequently at a height of 150 feet above the present streams. It rests directly on the upturned edges of the schist, which is found to be of a saprolitic character. The gravel contains rolled particles of gold. It is to be regretted that up to the present this gravel has not been found payably auriferous, otherwise the courses of the ancient channels which the gravel occupies would have been traced. It is, however, a forceful commentary on the nature and origin of the gravel to state that it has been found so high above and so far away from the present water-courses that, although its character of stream-detritus is not to be doubted, it is impossible to extract its values at a profit because of lack of water.

The region of the Ural presents conditions of topographic uniformity at points remotely situated from one another. Thus the high-lying auriferous gravel has been found by the writer, under conditions almost exactly similar to those described above, 250 miles north of the *Ui*, in the vicinity of the rivers *Reft* and *Pishma*. The *Pishma* region, 100 miles to the north-east of the city of *Ekaterinburg*, is not Steppe, but is covered with a growth of pine-forest, which, as in all the northern country, serves to conceal in part the topographic details. It is, however, certain that the peneplain which has been described extends over the whole of the Ural, at any rate as far north as the town of *Bogoslovsk*, latitude 60° N., and it is extremely probable that the water-worn gravel would be found at many points over its surface occupying a position averaging 150 feet above the level of the present drainage.

The Ural chain, in the region lying to the north and south of *Kushva*, a station on the *Perm-Ekaterinburg* branch of the *Siberian railway*, is remarkable for the presence of numerous metalliferous ore-bodies, principally iron oxides of greater or less purity. These ore-bodies are frequently of considerable size, occurring in the form of bosses in the surrounding granular rocks. By their greater ability to resist erosion as compared with the country-rock, they have become, topographically considered, monadnocks in a sur-

rounding sea, so to speak, of peneplain. The most conspicuous examples of these monadnocks are the hills of Blagodatny, near Kushva, and Bogoslovsk, 150 miles to the north. These rise to the height of only a few hundred feet above the peneplain. To the west and north of Bogoslovsk, however, in the almost unexplored wilderness of forest occupying the Ural crest at this latitude, may be seen typical dome-shaped monadnocks rising to 3,000 and 4,000 feet above the plain.

A most striking and comprehensive view of the present topographic conditions is obtained if one mounts to the top of one of the smaller monadnocks in the vicinity of the river Reft, in the forest-covered region between Ekaterinburg and Ibit. Here the peneplain, occupying a position from 150 to 200 feet above the present river-course, is almost level, and covered with an equal growth of pines and firs. The resemblance of the scene to that obtained at some point in the Southern Appalachians of the United States, where similar conditions exist, as, for example, in Northern Georgia, is truly startling. The counterfeiting is aided by the red color assumed by the decomposed saprolitic schists where they are exposed. Indeed, it seems to the writer that no two regions could be, both topographically and geologically considered, more nearly exact counterparts, the one of the other.

Toward the west, in the direction of the Volga, the peneplain lessens very gradually in elevation until it merges into the great plain of northern Europe, which stretches away indefinitely to the west and south. In the course of the railway journey from Kushva down to Perm the results of the former base-levelling are graphically displayed along the course of the Chusovaya river, a large tributary of the Volga, coming from the Ural. The present stream, subject to heavy overflows in the spring, has in its meanderings cut deep and sharp into the sides of the peneplain, which, occupying an elevation of less than fifty feet above the water, is difficult to distinguish from the immense recent flood-plain, composed of gravel, through which the river now makes its way.

It is a remarkable fact, patent to all observers in the district, and worthy of more study than has been given to it by the present writer, that the present streams of the Ural appear for the most part to be filling rather than cutting their channels. In other words, although the streams have cut, as has been said, to depths of 150 feet and more below the surface of the peneplain, they from some cause appear to have nearly suspended this action and wander about with very light grades in the midst of immense plains of

gravel. These plains are typical flood-plains, and are generally of a width about ten times that of the streams which penetrate them. A typical river, or rather creek, of this kind is the Serebrana, a tributary of the Chusovaya, heading to the south of the railroad west of Kushva, and flowing south for a distance of 150 miles. It has the peculiarity of all the streams of the Ural, and, in fact, of Siberia in general—that of retaining the same width for very long distances. The Serebrana will average 150 feet in width, and flows in a gravelly flood-plain of its own making, of a width of 1,000 feet or more. From the sides of this plain rise abruptly on both sides the rather steep walls of the peneplain, to a height of 200 feet at least.

In the perfectly flat gravel-plain the stream winds from one side to the other, making typical ox-bow curves and exhibiting all the characteristics of a miniature Mississippi. Crescent-shaped lagoons and bogs which have previously formed part of the river-bed are of constant occurrence. The flood-plain is covered uniformly, except in places occupied by the river channel, with a black soil to a depth of five feet, and except where the peasants have cleared the ground for agriculture, a growth of fir and birch forest has sprung up. As many acres have been laid bare of trees, large tracts of the surface of the flood-plain are open to observation. It is interesting to note the succession of ridges—now, of course, grass-covered—in the form of large curves, hundreds of feet in length, nearly parallel to each other and to the present course of the stream. These ridges are successive banks of gravel thrown up on the inner side of the curve as the river at this point made larger and larger sweeps, cutting at each swing more deeply into its outer bank, extracting material to deposit further down its course. The greater part of this cutting and filling is undoubtedly done in the spring months, when the volume of this river, and of all those of which the Serebrana is a type, is greatly increased. Occasionally, in fact, the whole flood-plain is under water during the time of the breaking up of the ice and the melting of the snow. The covering of the gravel-plain with silt, forming a soil, and the consequent forest growth, is thus explained. Although the velocity of the stream averages two feet per second in the dry season, and must in the spring be considerably accelerated, yet it is likely that the actual eroding action of the stream at present is very small. Its energy is expended in transporting and retransporting hither and thither the gravel and silt encumbering its valley. The percentage

of this material actually carried out of its own valley into that of the Chusovaya must be an almost negligible quantity.

Not the least remarkable feature of the Serebrana valley is its shallow character. It has been well determined by pit-sinking in various parts of the flood-plain that from the surface of the soil down to the underlying rock the vertical section is but fifteen feet, and that the depth is remarkably uniform in all parts. Considering the fact that the valley occasionally reaches 2,000 feet in width, this lack of depth is extremely significant. It certainly points to the conclusion that much time has elapsed since the initiation of the present drainage. The small size, well water-worn and extremely uniform character of the pebbles, of which a large proportion are quartz, are evidence in the same line.

The description of the Serebrana river valley has been given with an amount of detail perhaps unwarranted by the tenor of the present article. The writer wishes to emphasize the fact, however, that the conditions here found are paralleled by hundreds of examples which might be cited, both in the Ural, along its entire length, and, with a difference only of scale, in Central and Eastern Siberia. Taking the Ural alone, however, it affords an example of remarkable uniformity of conditions extending over great areas. It is difficult to realize to-day, as one looks at the gently rolling steppe and the hills of insignificant height which compose the Ural, that here must have existed peaks as high at least as the Alps and the Sierra Nevada. Evidence afforded by the detritus of these mountains and by the various topographic conditions which have been referred to leaves scarcely room for doubt that the existing Urals are but the bases of mountains which were several times the height. From the facts set forth in this article, it appears to the writer a tenable opinion that the Ural is one of the oldest ranges, if not the oldest mountain range, to be found in those portions of the earth's surface known to scientific investigation.

CONDITIONS REQUISITE TO OUR SUCCESS IN THE PHILIPPINE ISLANDS.

AN ADDRESS DELIVERED BEFORE THE AMERICAN GEOGRAPHICAL
SOCIETY, FEBRUARY 20, 1901.

BY

GEORGE F. BECKER.

A famous zoologist once said to me: "Human actions are determined to the extent of 90 per cent. by heredity, of 9 per cent. by environment, and only to the extent of 1 per cent. by free will." He spoke as an expert student of evolution. That I am not, but such observations as I have been able to make tend to confirm his paradoxical conclusion. Nations only partly resemble individuals, because in communities there is more or less open disagreement between the discordant elements which go to make up the whole. Yet of nations as well as of individuals it is true that under given conditions they will obey impulses which are in fact irresistible, though their action seems voluntary when superficially considered.

The United States has established itself in the Philippine Islands. The manner of their acquisition from the power which formerly owned them appeals to the imagination of the people of the Union. The opposition which the natives have made to our occupation of the islands has aroused the doggedness of our Teutonic race; and the task of developing the immense resources of the archipelago appeals most congenially to a nation descended from pioneers. The States of this Union will retain possession of the Philippines. The American people really could not give them up; for, as the colloquial phrase aptly puts it, we are not "built that way." To our retention of them there is great and even passionate opposition on the part of those who do not share in the national temperament. To gauge the efficacy of this opposition, fancy that the President were to send to Congress a message recommending our abandonment of the archipelago. The roar of protest which would then arise would be to the murmur now audible as a typhoon to a zephyr.

Thus, irrespective of individual opinions on the wisdom of acquiring territory in the Far East, it is reasonable that our people should turn their attention to a study of the ways and means by which our East Indian possession may be rendered tranquil and prosperous.

In such a study information is the first essential, for many misconceptions are current. Much that is true has been said or written of the Philippines and their inhabitants; but it requires knowledge and skill somewhat like an expert's to know whither to turn for the truth and how to discriminate it. I spent 14 months in various portions of the archipelago on a mission of inquiry, and that is my excuse for attempting to throw some light upon the beclouded way.

As is well known, the first inhabitants of the Philippines of whom traces now remain were the Negritos, a race of black dwarfs with customs marking the lowest stage of culture. As a rule they have no habitations, sleeping where night overtakes them. They use poisoned arrows, and it is said that most of them can count no more than 5. It is not equally well known that when the Spaniards first came in contact with them they all spoke a single language. Only a few Negritos now remain, in scattered bands, numbering, it is thought, some 25,000 in all. Politically they have no importance whatever. The Filipinos with whom we have to do are chiefly of Malay blood, somewhat admixed, to be sure, with that of other races, but still substantially Malay.* These people invaded the country from the southwest; wave after wave of incursionists reached the islands, much as the Danes and Saxons descended upon the British coasts, and with analogous results. Each fresh invading horde sought to conquer a region for itself, either from the Negritos or from preceding invaders. They must have come from various localities and have entertained little feeling of kinship for one another; for they spoke, as they still speak, many languages, all of them indeed of the Malay family, yet mutually unintelligible. More than 60 such languages still survive—the clearest evidence of past political disunion; 60 languages without counting dialects, in an area smaller than that of New Mexico. Nothing but persistent enmity and non-intercourse could have preserved such linguistic variety. Yet this by no means measures the political diversities which existed when Magellan discovered the Philippines. Among the Visayans who then spoke and still speak only one language, though numerous dialects, he found various communities openly hostile to one another, and it was in one of the petty wars between different bands of the Visayan tribe that the great Captain lost his life.

From the utter lack of culture represented by the Negritos upwards almost every age of civilization is represented in the Philippines. In eastern Mindanao a heathen tribe, called the Manobos,

* In Mindanao there are some wild tribes of Indonesians, who have a larger share of Caucasian blood than the ordinary Malays.

practice ceremonial cannibalism and offer to their gods human sacrifices. In northern Luzón, too, there are head-hunting tribes, and some of these also have been accused of cannibalism, though, so far as I can discover, without sufficient proof. Even among the Visayans there seem to have been somewhat recently anthropophagous tribes. The Mohammedans stand on a considerably higher plane of culture than do the pagans, but their religion is said to be a very corrupt form of the faith of Islam, and they are at best semi-civilized. The Christian faith includes all the communities which can be called civilized, and a good many to which that term is applicable only by courtesy. Fortunately the Christian communities are far more populous than either of the others. No exact data exist, but it is supposed that about three-fourths of the population of the islands are Christian, and that they occupy about three-fifths of the territory. It is sometimes assumed that only the Christians of the archipelago need to be considered, because of the relatively small numbers of the unchristianized tribes; but this seems to me very doubtful. The pagans have been able to adhere to the faith of their fathers, a species of ancestor worship, because of their warlike character and the inaccessibility of the regions which they inhabit. As for the Moros, their holy law is a gospel of war, and it will be the easiest thing in the world to rouse them to fury. Thus far, however, they have shown a very friendly disposition to the United States, thanks to judicious treatment, initiated by General Bates.

That hostile feelings should exist between the pagans, the Mohammedans, and the Christians of the Philippines is at least very intelligible; but there are enmities also between Christian tribes. The Ilocanos, Pangasinanes, Pampangas, and Macabebes all detest the Tagalogs, who, indeed, are much disliked even by the relatively peaceful Visayans.

These facts are common knowledge, and it would not be worth while to state them here if they did not point to an inference which is as evident as it is important. There is no such thing as a Filipino people, and there never has been one since the Negritos were driven out of the choicer part of the country. The intertribal relations in the Philippines prior to their discovery by Magellan were very like those which prevailed until the last century among the North American Indians, and the diversity of language is, in the one case as in the other, a lasting evidence of the political chaos which existed. The only common bond between the Filipino tribes has been their partial or complete subjection to the Spanish Crown. Nothing but conquest will ever unify them.

That the Filipinos share with one another certain traits of character is certain, but the likeness is often exaggerated by observers new to the archipelago, who fail to discriminate the diversities included under the general type. The communities which make up the population of the Philippines bear no greater resemblance to one another than do the peasantries of Italy, Russia, Spain, and Germany. Temperament and customs divide them as well as language.

The vast majority of the Christian Filipinos are substantially illiterate peasants, who know little and care less about any tribe excepting that to which they belong, and who speak no other language than their own. I say they are substantially illiterate because, although many of them can read a little, practically the only books which exist in the native languages are elementary devotional tracts prepared by the priests. To this statement the Tagalog is a partial exception, a few volumes of poetry and other literature having been printed in that language. Yet those who read habitually or frequently read Spanish by preference, and not the native language. It fell to me to procure for General Otis a translation of his proclamation of January, 1899, into Tagalog. I found great difficulty in securing a trustworthy and orthodox version, for the most prominent natives of Manila, lawyers and physicians, and men of much culture, confessed to me that they possessed no critical knowledge of literary Tagalog, and read it with some difficulty. Away from the larger cities the Spaniards discouraged the aspirations of natives to master Spanish, and even a few miles from the capital it is often hard to find persons who understand that language. Mr. Aguinaldo himself speaks Spanish with difficulty, and ill. In fact, outside of a few of the largest towns, it is only among the higher officials and the capitalists that Spanish is spoken with ease, and these are thus the only persons to whom the news or the learning of the world is accessible. It is among these better-educated Filipinos that the warmest friends of the United States are to be found, men who have something at stake and who know something of the world.

These facts show that there is no such thing as public opinion in the Philippine Islands in the sense in which that term might be used of any homogeneous race, or of a community with a homogeneous civilization.

The revolutionary sentiments which have found such loud and, sometimes, eloquent expression originate with a very limited class, composed chiefly of Chinese *mestizos*, or mixed breeds. This cross constitutes a small but important element of the population. The

Chinese mestizo is the only half-breed in the world who considers himself very much superior to either of his parents. In truth, he is an intelligent and energetic man, and sometimes also a good one. Many of these mestizos, however, entertain the strongest antipathy to everything of European origin, and are extremely unscrupulous in their methods of pursuing their aims. They also overrate their ability in the conduct of public affairs. They have sought to establish an oligarchy in the Philippines, and in the attempt they have demonstrated, even to their own people, their administrative incapacity.

Gen. James Franklin Bell and I have a friend—a Filipino woman—who occupies a very responsible position in, a large business establishment. She formerly had strong sympathy with the cause of "independence." Lately she has informed the General that she would rather see any government on earth assume charge of the Philippines, even the Chinese government, than take her chances under native rule, and this she has frankly been telling her countrymen. You may wonder that I quote a woman on such a subject, but ordinarily a Filipino woman is brighter than her husband, and I know of no other country where women exert an equal amount of influence. The experience of Negros in self-government is most instructive. I was on that island when the native government was organizing in May and June, 1899, with assistance, indeed, from the United States, but without any compulsion or interference. I even had a little to do with smoothing the way for the new administration at Damaguete, Negros Occidental, and thus came closely in contact with the leading officials. They seemed to me both well meaning and able. I thought they had a fair chance of success under our protection, and it was certainly a better chance than the natives could have enjoyed in any other Christian province. The attempt was a failure, however, and the Negrenos had to fall back upon the Americans and request them to organize and conduct a stable and orderly civil government. Englishmen of long residence even declare that the natives have too little respect for men of their own race to submit peaceably to them. It is difficult, perhaps impossible, to convey to any audience in this country the impression of political incapacity which the Filipinos produce on almost every one who is thrown intimately in contact with them for a considerable period. Any close observer finds among them a lack of the sense of responsibility and an absence of settled principles of action not dissimilar to those with which we are familiar among American boys in their teens. A community of our boys left wholly

to themselves, without guidance or restraint, would soon come to grief, while the same boys, properly advised, might do very creditably; and so may the Filipinos.

If the Philippines were to be left to themselves now, it is clear enough what would happen. War would break out at once in various directions. The Moros would not merely renew their piratical raids, suppressed less than half a century ago, but carry on an active propaganda for the faith at the point of the sword; instant conversion or instant death. The tribes of Luzón would not submit to Tagalog rule unless first conquered, and each petty chieftain of a guerrilla band would fight for his own band, hoping to emerge from the chaos as dictator of the country. Before absolute anarchy was attained, however, some strong power would step in and teach the Filipinos to weep for the departed Americans.

The insurrection of February 4, 1899, was not a surprise. The probability of such an outbreak had been evident for months, but it was hoped that better counsels would prevail in the native camp. Everything possible was done to avoid giving even specious provocation to the natives. Our military government and our men showed the utmost forbearance under gross provocation from the Filipinos. This I know from observation, and because I was in a position to learn officially all that went on. In fact, I was acting as first assistant in the Bureau of Military Information, and enjoyed the full confidence of my chief, Major Bell, now, for extraordinary merit, promoted Brigadier General. The attack took place on the evening of February 4. As fast as horses could get us there Major Bell and I made our way to the Nebraska line, where the first shot was fired, and we remained there, or on adjacent portions of the line, throughout the engagements of the night. The circumstances of the collision were investigated immediately, rigorously, and with full authority, only about half an hour after it occurred. The gallant Col. Stotsenburg (who died the finest of deaths a few weeks afterwards, at the head of his regiment) gave us full information with military frankness and terseness. So also did other officers, and there was no conflict of statement or opinion. I heard Major Bell dictate in the dark every word of his lucid dispatch on the subject to the Military Governor, the telegraph tent being under a fire so heavy that no light could be burned. It is superfluous to say that the account thus obtained was precisely that given by General Otis in his dispatches and his annual report. The outbreak was a wanton and deliberate attack of the Insurgent forces on those of the United States, with no color of provocation on the part of the Nebraska regiment. The attempt

was made to force our sentry for the evident purpose of drawing his fire. He did simply his duty, not omitting due challenges before maintaining his post with the weapon entrusted to him for that very purpose. The Insurgents were only waiting for this signal and instantly responded with volleys.

Between our forbearance and the lies which their leaders had disseminated, the rank and file of the Insurgents really believed us cowards. They actually boasted before the outbreak that one Filipino could whip five Yankees, and they were confident that they should sweep us all into the bay that night. It is one of the many excellent traits of the Filipino that he despises cowardice. He is so old-fashioned as still to believe personal courage essential in the members of a ruling class. Hence, when once the impression had got abroad that Americans were cowards, quiet in the Philippines was impossible without a preliminary conflict. May the Filipino never lower his standard, or have cause to be disappointed in American bravery.

The insurrection in the Philippines has lasted much longer than most people thought probable. It is, indeed, almost impossible to free forecasts of future events from every tinge of hopefulness. Nearly all wars and insurrections have lasted longer than it was believed they would last. The Germans supposed the Franco-Prussian war at an end when the battle of Sedan had been fought; we thought trouble in the South over when Lee surrendered. In most cases the field of war is fertile enough to bear an aftermath which must be harvested. Our authorities, in forecasting the future, did not sufficiently count upon the sustaining effect of the support which the insurrection has received from a small but vociferous section of our own people. This was particularly thrust upon my attention, because I was ordered to read and report daily upon the newspapers published by Mr. Aguinaldo's adherents, and these were full of it. The natives frankly told me eighteen months ago that they proposed to fight on till the fall elections, and if those should go against their partisans, they would try to hold out till the Presidential election. This has turned out to be true. Organized opposition, in any proper military sense, ended a year ago; but irregular warfare has continued, and made long casualty lists. Some people refuse to believe that anti-imperialism has really stimulated the opposition of the Filipinos; yet it has done so beyond a peradventure, and the fact is perfectly explicable to any one who is in the least familiar with the conditions. The Filipinos are entirely unaccustomed to free speech, and the abuses of which it is capable. To

their minds the fact that diatribes against the Government could be printed in this country, was conclusive evidence that the party in power was at the point of collapse and unable to suppress attacks. The anti-imperialistic agitation has been hard on the American soldier, and harder still on the Filipino; but it has had its peculiar advantages, for it has enabled a number of gentlemen to demonstrate to their own satisfaction how much holier they are than their fellow-citizens. They have built about themselves shrines of skulls.

The insurrection, however, might have been ended earlier in spite of American support. From a purely military point of view, greater severity would have been advantageous. Had the laws of war been rigidly enforced, had prisoners been closely interned, had spies and those who violated parole been promptly shot, there is every reason to believe that opposition would have been crushed out ere this. I am very glad it has been otherwise. No war in the world was ever waged so humanely and magnanimously as we have conducted this. Furthermore, I have, from most excellent sources, information that the Filipinos appreciate this fact. Thanks to the mildness of our commanding generals, when peace is at last fully established there will be no residual bitterness and hatred to overcome. The Filipinos do not hate us now, and if we treat them under civil government with as much fairness and generosity as the army has shown them, they will be and remain loyal subjects of the Union.

The average native has long been sick of war and ready for peace. Wonder is often expressed that, if this be true, there is not an apparent reaction in our favor. But this is not strange at all. Only the Americans and the Insurgents possess firearms. Under Spanish rule natives were not permitted to have them, and the insurgents have found great difficulty in procuring even the limited number now in their hands. A native not permanently resident in a garrisoned town, who is known to be in sympathy with the Americans, is thus completely at the mercy of the Insurgents. Furthermore, though as a rule, to which there have been some exceptions, the hostile Indians have treated American prisoners with humanity, they are merciless to natives believed to oppose the insurrection. Prudent native sympathizers with the United States have therefore awaited the cessation of hostilities.

The Administration and the commanding officers of our military services have been pitilessly criticised for their alleged blunders. It would seem, indeed, according to the critics, that our leaders

are so phenomenally perverse as never by any chance to do right or well. The assumption is constantly made that there has been some possible plan of action in the Philippines attended by no inconveniences or drawbacks. There never has been a complex transaction which would not have gone off more smoothly had the responsible leaders been gifted with supernatural foresight. This the critics of the national policy certainly are not, and I do not believe that any set of men exist who could have conducted affairs in the Philippine Islands with fewer or less important mistakes than have been made. Had we returned Manila to the Spaniards, or abandoned the islands to Mr. Aguinaldo, or sold them to a European power, the sum of human misery involved would have been far greater than it has been, even without reckoning the humiliation which such a policy would have entailed upon the people of these forty-five United States. A conflict with the natives was inevitable from the start, though at first we did not know it, and had no means of ascertaining it. It has been conducted on what a very few military critics scoff at as "the lovey-dovey system," a system of which we have every reason to be proud. It is the system consistently favored by our generals, and which has been loyally carried out by their subordinates, even those who took a more purely military view of the best policy.

The officers of our united services have acquitted themselves with all possible credit. No military glory of the highest order, to be sure, is obtainable in a war with semi-civilized peoples, for the most brilliant feats of strategy do not enter into such a contest. But the finest tactical ability has been shown, and admirable efficiency, accompanied by inexhaustible courage. Nearly as important has been the adaptability displayed by our officers, and their simple-minded devotion to any duty, whether technically military or not. No one but the few who have seen it will ever appreciate the tact and good judgment manifested by officers of our army in keeping order in Filipino communities, where mildness was essential and the exercise of arbitrary power indispensable. Nothing but genius or careful training suffices to teach men the skilful and humane use of arbitrary power. To this an officer in either service is educated from boyhood, and, as far as opportunity offered, the officers of the navy, including the lieutenants in command of vessels of the mosquito fleet, have demonstrated the value of this training, as well as the officers of the army. It is time now to introduce civil government in portions of the archipelago, but I trust that a goodly share of the offices may be temporarily filled by military

officers, and that the civilians associated with them may study their methods of using, without abusing, power.

Some people fear the growth of the army and of the military spirit in this country. They must be thinking of a military spirit very different, indeed, from that which prevails in our services. There is not in the United States or in its territories and dependencies any body of men which compares with the officers of our army and navy in the combination of qualities they display—upright and intelligent devotion to duty, appreciation of the rights and liberties of American citizens, and thorough-going patriotism. Why, if the people would only study it and profit by it, the cost of the army would be repaid by the object-lesson it affords in merely civic virtues! Our military forces have earned in the Philippines all the credit which the situation made possible. Furthermore, they have kept the flag clean. I do not mean to assert that no individual on the rolls or the roster of the army of the United States has done anything discreditable. The entire suppression of crime and misdemeanor has never been accomplished in any populous community, civil or military. But the criminal acts of individuals committed in contravention of orders no more defile the Stars and Stripes than the rabid assertions of slanderous writers concerning the "pollution" of the flag befoul anything except their own reputations and environment.

Peace seems to be approaching in the archipelago, and the questions which will soon press for solution are many. How are we to let in upon the Filipino tribes the light of our own civilization, the best we have, be it absolutely good or bad? Our own experience answers the question—roads and schools. Wagon-roads, trolleys, and railroads, must be built as fast as possible, either at public expense or, better, on franchises carefully guarded against monopoly. Primary schools and grammar schools must be started everywhere, with instruction for all the higher grades in the English language from the moment when the children are able to comprehend sentences in our own tongue. For higher instruction let the Filipinos be encouraged and assisted to come to the United States, in order that they may learn our manner of life as well as our books. They already manifest a desire to do so by sending young men to our schools, and the more that come the better for them and for us.

The lands of the religious orders ought clearly to be purchased. Only so can treaty obligations be observed and a source of grievous irritation in Filipino communities be removed. It seems to me

the true policy for the United States to buy these properties, the cost to be reimbursed by the government of the Philippines gradually, and from the revenues obtained from the lands. Mr. John R. Proctor aptly suggests the application to these lands and to the entire public domain in the Philippines, of the system of government leases, in part perpetual, which is meeting with such brilliant success in New Zealand. It does away with all disputes as to title, and absolutely bars the accumulation of holdings acquired for the sake of an "unearned increment."

Laws and regulations governing the Philippines require most delicate handling and a thorough knowledge of the conditions. The fiscal policy suitable to, or popular in, the States would not be adapted, at least for the present, to the needs of our Asiatic possessions. The Philippines are and must ever remain chiefly agricultural; and, although factories will spring up in time, our first object should be to foster much-needed prosperity on the industrial lines to which the people is wonted. For the present they should have a tariff for revenue only, and if industries there are ever to be protected, taxes for that purpose should be introduced very cautiously, with consideration for the people as a whole.

The great diversity in temperament, religion, and civilization among various tribes also makes it essential that the government of the Philippines should have, under due but not excessive checks, a free hand in framing laws. A holy war with Mahomedans is always a formidable matter, because it is the ambition of the followers of the prophet to die on the field of battle. It is also easy in mere ignorance to give offence to Mahomedans which they will regard as a *casus belli*. With their religion we have nothing to do. It may be possible by diplomatic treatment to keep at peace with them and to procure the abolition among them of the mild form of servitude which they maintain, something utterly different from slavery as we are accustomed to think of it, and resembling rather the feudal system of Europe in the Middle Ages. The pagan Igorrotes, Irayas, Manobos, and many other tribes will require very different treatment each from the other and all from the Moros. It will be an immense job, requiring all the ability and nerve of our own best young men as local advisory residents or as provincial governors for its successful accomplishment, as well as free and steady hands at the helm in Manila. Not only our own men but our women also in the Philippines should be fully occupied in public affairs. As I have said, the Filipino women are both intelligent and influential. They can be most easily reached through our own women, who

should seek to gain their confidence and to exert themselves systematically for the good of both races.

By all means let Congress enact only the most indispensable laws, defining the relations of the Manila government to the suzerain. Give the Philippines a territorial charter, but one in which freedom of action is secured to the responsible officials representing the Home Government, a freedom corresponding to the responsibility which only they can adequately sustain.

Above all things, let every decent man see to it that merit, merit only, shall control the selection of American officials charged with fostering the civilization and development of the youthful people with whose wellbeing we have charged ourselves. When an American community is ill-governed I care little. The remedy is always in the hands of the members of the community, and if they are so supine, or so busy with their private affairs, as to submit to extortion or ill-treatment, they deserve what they get, and the more they smart for their neglect the sooner they will be aroused. With a dependent or less competent people it is far otherwise. All the millions stolen by the Tweed ring are of trifling importance compared with the few score thousands shamefully peculated in Cuba by officials of the Post Office Department. The pillory and the whipping-post are too good for such scoundrels. The very essence and gist of our success in the Philippines is to send to them as representatives of the United States our cleanest, most intelligent, and ablest men; men who recognize that the highest destiny which can possibly fall to the lot of a real man is to serve his country honorably and successfully. The Philippine Commission contains men of the right stamp, and the Administration is striving to adhere to the merit system in its selection of other officials.

Let us, the public, see to it that honorable and able service meets with due appreciation, while vilification is reserved for evildoers, and it will soon become the fashion for honorably ambitious youths to seek service in the Philippines. Then will the reflex action on our own body politic reward us for all the trouble and anxiety the archipelago has cost us, and we shall turn with delight to the contemplation of a prosperous and loyal Philippine community, at last and for the first time a real Filipino people, making full use of the fairest area among the possessions of the United States.

MOUNTAIN PASSES: A STUDY IN ANTHROPO- GEOGRAPHY.

BY

ELLEN CHURCHILL SEMPLE.

Mountains influence the life of the people dwelling in and near them fundamentally, but variously. To one slope they give perhaps an abundant rainfall, to the other they show a cloudless sky and yield only from their melting snows a scanty supply of water. The Himalayas are flanked by the teeming population of India and the sparse nomadic tribes of Tibet. Mountains draw just such clear-cut lines of contrast in temperature. The Scandinavian range gives to Norway the warm, soft air of the Gulf Stream, while a hundred feet below the water-shed on the eastern side Sweden feels all the rigor of a sub-frigid climate. An upland system may offer broad, fertile valleys for cultivation, like the Valley of Virginia; or it may present only narrow gorges of erosion, as in eastern Tennessee and Kentucky, restricting agriculture and condemning the whole region to poverty and isolation; or it may in effect prohibit agriculture, if situated in high latitudes, where the timber-line drops well below the crest, and may force its inhabitants to the semi-nomadic life of shepherds, as in Norway and in some parts of Switzerland, where the summer pasture lands on the heights support the flocks and herds; or mountains may promote the rapid development of a people by great mineral resources, as in the Harz, the Rockies, and the western Alleghanies. These influences are some beneficent and some deleterious, always varied. But in one respect mountains always play the same big part in history. They are always barriers, always obstacles, more or less difficult to surmount, and, therefore, always a challenge to the energies of man. Their beauty, the charm of the unknown beyond, tempts the enterprising spirit; but the hardships and dangers they present daunt or baffle the mediocre, while by the great ones of the race who succeed is found beyond a prize of victory. Such were Hannibal and Napoleon and Jenghiz Khan and those lesser heroes of the modern work-a-day world who toiled across the Rockies in the feverish days of '49, or who faced the snowfields of Chilkoot Pass for the frozen gold fields of the Yukon.

For migrating, warring, and trading humanity, therefore, the

interest of the mountains is centred in the passes. These are only dents or depressions in the great uplifted crest, or gaps carved out by streams, or breaches in the mountain wall; but they point the easiest pathway to the ultramontane country, and for this reason become the focus of all the great highways on either slope, as well as of the side valleys within the mountains themselves. Their influence is far-reaching. The Brenner, in the eastern Alps, by its continental trade in the Middle Ages, made the greatness of Augsburg, Ratisbon, Nuremberg and Leipzig to the north, and promoted the growth of Venice in the south. The Khaibar Pass, in northern India, and the Gates of Herat, in western Afghanistan, are never lost sight of by the British and Russian Governments in formulating their Asiatic policy. Passes never become insignificant, are never unused except when the deep cover of winter snow temporarily renders travel impossible. They are nature-made thoroughfares, traversed now by the undisciplined hordes of migrating barbarians, now by the organized army of the conqueror, now by the woolly flocks and guardian dogs of the nomad pastor, now by the sumpter mules of the itinerant merchant, now by the engine toiling up the steep grade with its heavy train. Nowhere else does history repeat itself so monotonously and yet so interestingly as in mountain passes.

Mountain ranges form in general great natural cleavage lines of drainage basins, of flora, fauna, races, population, commerce, and consequently of nationality and political dominion. Most of the history of central Europe since the time of Charlemagne has meant the slow evolution of the scientific boundaries of the modern States formerly embraced in his great empire, along the mountain ranges marking their natural frontiers. The latest step was taken in 1871, when the nascent German Empire drew its frontier along the Vosges crest instead of in the valley of the Rhine. All the States in the upland part of the continent have one or more mountain boundaries. Five States abut upon the Alps. The Vosges, the Alps, the Böhmer Wald, the Riesen and the Erz ranges form the highland frontiers of Germany. Even in our own republic, where State boundaries count for little, "the mountainous back-yards of nine states," as a recent writer picturesquely expresses it, extend up into the lofty ridges of the Appalachian system.

Besides forming natural frontiers, mountains serve as border defences, and for this reason, too, recommend themselves as political boundaries. The effectiveness of such defence depends upon the character of a range as a barrier. This in turn is determined

by the height, length, width, form, and location of the mountains themselves and the passes that traverse them. The Tian-Shan mountains, with a length of twelve hundred miles and a mean width of two hundred and forty miles, raise a wall 16,000 feet high across Central Asia in which there are almost no gaps except near the eastern and western extremities. The Pyrenees, the Caucasus, the Scandinavian system, and the Andes, on account of the scarcity and great elevation of their passes, have always acted as great barriers. Epirus and *Ætolia*, fenced in by the solid Pindus range, took little part in the common life of ancient Greece; but Thessaly, with its intermittent chains, was a passway between Macedon and Hellas. The Hindu-Kush, from the Pamir to the Pass of Bamian northwest of Kabul, forms a crescent a hundred and twenty miles long, in which there are at least twenty gaps, varying in height from 11,000 to 15,000 feet and sometimes accessible to caravans of camels. These mountains, therefore, in spite of their height, presented open doors to the succession of invaders who left Turan and Iran for the fertile plains of the Indus. The passes in the Suleiman Mountains along the Indo-Afghan frontier number two hundred and eighty-nine, every one capable of being traversed by camels; and in the continuation of the range along the borders of Baluchistan there are seventy-five more. An enemy's army stationed at Kandahar would command most of these passes; hence the importance of Kandahar to British India. The Alps have an astonishing number of excellent passes, for the most part evenly distributed, so that it is possible to traverse the system from one side to another in any direction. The Appalachian system is some three hundred miles in width and thirteen hundred miles in length; but there are excellent gaps in the linear arrangement of its parallel chains, which afforded natural, though circuitous, highways to the early winners of the West. The disposition of the passes is such that, one range penetrated, the next presents a similar barrier, so that the longitudinal valleys in between have to be traversed before another opening can be found. The pioneer who started across the mountains from Virginia could come out on the slopes of the Cumberland Plateau either by way of the Kanawha River to the Ohio, or down the valley of the Holston, through Big Moccasin Gap, Big Stone Gap, and Cumberland Gap, into southeastern Kentucky.

The Appalachian system could also be avoided by making a long detour to the south, where the mountains run out into low hills in the eastern Gulf States; but where a range extends down to the ocean, like the Alps, or reaches from sea to sea, like the Pyrenees,

the Caucasus and the Grampian Hills of Scotland, its blockading character is enhanced, especially for military purposes and in a primitive stage of civilization, before the achievement of maritime development. The Caucasus was a barrier to most of the migrating peoples of antiquity. The Romans never got across them. The Persians only temporarily forced a wedge of conquest along the Caspian shore. Mountains thus located develop a few geographical conditions peculiar to themselves. As a rule, at one or both extremities they sink to meet the flanking seas; and here, between upland and water, they may afford a natural highway only a little above ocean-level. The Pyrenees are crossed by only two railroads between France and Spain, the Bayonne-Burgos line along the shore of the Bay of Biscay, and the Narbonne-Barcelona line, overlooking the Mediterranean. Between these two extremities there are only two practical passes for carriages—the Col de la Perche, between the valley of the Tet and the valley of the upper Segre, and the Port de Canfranc, on the old Roman road from Saragossa to Oloron.

Some mountains thus located offer a pass at one extremity, but at the other drop off abruptly into the sea. The Pass of Derbent, or the *Pylæ Albaniæ*, as it was called by the ancients, lies between the Caspian and the last offshoots of the Caucasus, and in all ages has been the highway for the peoples entering Persia and Georgia from the north. The Russian railroad from Rostov, at the mouth of the Don, on the Sea of Azov, to Poti, on the Black Sea, runs along the northern base of the Caucasus to Derbent, where it follows the pass between mountains and sea to Baku; here it doubles the eastern end of the Caucasus and follows the valley of the Kur westward to Poti. The western shore of the Caucasus daunts the Russian road-makers to-day; and in antiquity the retreat of Mithridates along this wild coast, when driven out of his kingdom by the victorious legions of Pompey, was considered one of the marvels of the age. We see the same contrast between the eastern and western Highlands of Scotland; one of the two railroads running north and south through the country hugs the eastern shore. Even in Greece, where the arrangement of the mountains is much more complex, the Pass of Thermopylæ again is on the eastern rim.

For purposes of trade these intermarine mountains offer a less effective barrier, because they can be avoided by an easier and cheaper sea route. Hence on each side of such ranges we find active seaports develop, like Narbonne and Barcelona, Bayonne and Bilbao, with Santander; the Azov ports and Poti, with Trebizond,

on the Black Sea; Petrovsk and Baku on the Caspian. Analogous is the position of Marseilles and Genoa in relation to the Maritime Alps. In time of war such ports are always the object of attack by the invading force, because they can be made the base for military and commissary supplies. In the Peninsular War almost the first act of the French was to seize Barcelona, San Sebastian, and Bilbao; and throughout the seven years of the conflict these points were the centre of battle and blockade and siege. If Russia ever undertakes to acquire the upper Euphrates valley from Turkey, Trebizond will repeat the history of Barcelona in the Peninsular War.

In plains and valleys highways may be built arbitrarily, bending to north or south, east or west, as expediency suggests; but in mountain regions the passes dictate the route of the thoroughfare. In the highest ranges there is no appeal from this; but in the lower systems, especially in those old mountains which have been rounded and lowered by the action of time, economic and sociological considerations may in some instances be of greater moment than orographical conditions in determining the location of highways. Nevertheless, the law holds good that the pass points the road. In the eastern Tian-Shan, where the range reaches only 10,000 feet elevation, the passes are 9,000 feet high; and in the western portion of the system, where the crest is 16,000 feet high, the passes are from 11,500 feet to 13,100 feet high, so that the range preserves everywhere its wall-like character. It has, therefore, determined the routes of two great historic highways from China to Bukhara and Samarkand. These roads diverge at the town of Chami or Hami (elevation, 2,700 feet), on the northern edge of the Gobi Desert. One, now the imperial road, leads north across the Kosheti-Davan Pass (9,100 feet) to Barkul, thence along the base of the range westward by Kulja and the Ili River, and over western offshoots of the Alatau range to Tashkent. This was the route followed by the Mongol and Tartar hordes in the thirteenth century, and was even then a great commercial highway. The other runs almost parallel with this one, directly west, along the southern base of the Tian-Shan for almost a thousand miles up the Tarim basin to Kashgar, and above this city it leads by the high passes between the Tian-Shan and Alai, or over the northern Pamir, to the head streams of the Syr-Daria and the Oxus. The Bukhara-Samarkand railroad has recently been extended by Russia northeastward from Khojent to Andijan (1,400 feet), whence trade can move over the Terek-Daban Pass (12,200 feet) and connect with this second route at Kashgar. All the western approaches to the northern route

Russia already controls by her possession of the district between Lake Balkash and the Tian-Shan.

On another great upheaved area in this vicinity Russia has also made good her claims; but the Pamir, despite the great height of its passes—in consequence of its character as the focus of five great radiating mountain systems—assumes a different anthropogeographical aspect. The Pamir has an estimated area of 30,000 square miles. It rises 13,000 feet above the plains of Turkistan, and is limited on the north, south, and southeast by ranges that tower eight or ten thousand feet higher. Moreover, the plateau itself is traversed by minor ridges, which rise two or three thousand feet above its surface, and between which the streams drain east and west without any well-defined watershed. This topography lends to the whole Pamir the character of a great pass area. From its summit or its slopes drain four great rivers of Asia—the Syr-Daria, the Oxus, the Tarim, and the northern tributaries of the Indus. Only the last river, however, reaches the ocean. These streams form natural avenues of approach. On the surface of the plateau the transverse ridges present no serious obstacles, and the valley routes between can almost be compared to artificial highways. More than this, the Pamir is a famous pasture land, and the grass grows as thick in some places as in the grazing grounds of Western Europe. The nomad Kirghiz shepherds bring their flocks and herds up here to fatten in the summer, and travellers, from Marco Polo's day to the present, have found here a regular supply of fodder for their pack animals.

For all these reasons, in spite of the great elevation of its passes (varying from 13,400 feet to 15,100 feet), the Pamir has been a great highway from the west to the east since the earliest times. It has been traversed by Greeks, Romans, Arabs, Italians, and Chinese; by traders, pilgrims, missionaries, explorers, and even by light columns of troops. The particular route followed by the early Greek traders, as indicated by Ptolemy, probably led from Bactria through the upper Oxus valley, and across the southern portion of the Pamir down to Kashgaria. Marco Polo followed about this route and descended to Yarkand in the Tarim basin, whence he skirted the desert of Gobi on the south and entered China proper by the headwaters of the Hoang-ho. In the tenth century, large Chinese caravans from "Serica," or the "Land of Silk," moved regularly up the Tarim basin and across the passes at the northeast corner of the Pamir to the sources of the Syr and the Oxus. Russia, with an eye to the possibilities of the Pamir,

annexed almost the whole of its area in 1886 to the administrative government of Bukhara.

An important question in connection with mountain passes is the difference in the grade and length of the slope approaching them. Rarely does the crest of a system divide it symmetrically. This means a steep, difficult approach to the summit from one direction, and a more gradual, and hence easier, ascent from the other. The country commanding the easy approach has in time of war a better chance to surprise the ultra-montane enemy by a sudden and swift descent from the dividing ridge, and can command a long line of successive points of supplies connecting with its real military base in the plains. For instance, if Russia and England should come into conflict along the Hindu-Kush and the southern Pamir, England's military base would be at Peshawar (1,160 feet), and the distance from here to her outpost at Fort Chitral (7,100 feet), at the southern foot of the Hindu-Kush, is 120 geographical miles as the crow flies. Russia's outpost, just across the Hindu-Kush wall from Fort Chitral, is Ishkashim (8,700 feet); her main military base would be at Bukhara (640 feet), her nearest railroad point, which is distant six hundred miles by the air line; but the long, slowly ascending valley of the Oxus would afford her an easy avenue of approach, while the towns and villages of upper Bukhara, with more abundant water than the cities of the Turkistan plains, can furnish adequate supplies up to the very edge of the Pamir. The problem of commissary and transportation is simpler for the Russians than for the English on the steep southern slope. The same contrast of slopes is seen in the Alps. The drop from the Brenner Pass to Munich is 2,800 feet, and to Rovereto, an equally distant point on the southern side, the road descends 3,770 feet. The political boundary of France, following closely the crest of the Alps from Lake Geneva to the Mediterranean, brings over two-thirds of the upheaved area within the domain of France, and gives to that country great advantages of approach to the Alpine passes over Italy. It is a matter of history, from the days of Hannibal down to the present, that the campaigns over the Alps from the north have succeeded, while those from the south have miscarried.

The Kirghiz nomads who frequent the highlands of central Asia from the Tian-Shan to the Hindu-Kush for the summer pasture are authorities on mountain passes; they distinguish four different kinds, for which they have four Tartar names. The *daban* or *davan* is a rocky, difficult defile; the *art*, a dangerous gap at high elevation; the *bel* is a low, easy pass; and the *kutal* is a broad open-

ing between low hills. As a bit of anthropogeography this nicety of discrimination suggests the twenty-one words for tints and shades of gray of the Samoyedes of Arctic Siberia. Though without this elaborate terminology, we yet distinguish as many varieties of passes. As a pass points a highway, the form most easily traversed is the one that plays the greatest part in history. Such a form is found in an almost complete break or dip of a mountain system. The natural depression of the Hudson and Mohawk valleys, only a hundred and seventy-five feet above sea-level, is the only decided break in the whole length of the Appalachians; this fact, together with its ready accessibility, made it an important factor in the history of the early colonies, as well as in the later history of New York. It was the natural route of communication with the Great Lakes, and enabled the colonists to tap the fur trade of the north-west, then in the hands of the French. Furthermore, trails from the Mohawk and Genesee to the Alleghany connected this depression with the Ohio and Mississippi, then claimed by the French. So, when the French and English came into conflict for supremacy in the New World, the Mohawk and Hudson valleys were their battle-ground, determined by the geography of eastern America. In later days this depression rendered possible the Erie Canal, and the greatness of New York City; and in the not remote future, when the Erie Canal is deepened, it will connect the proposed steel works on Staten Island with the ore-fields of the Mesaba Range.

An exact parallel to the Mohawk route is afforded by the Gap of Belfort. This is a low pass, twenty-five miles wide, between the Vosges Mountains and the Alps system, here called the Swiss Jura. Connecting, as it does, the long valleys of the Rhone and the Rhine, it has been the great historic route of trade and travel between the North Sea and the Mediterranean from the days of the ancient Etruscan merchants to the present. This was the route of the invading Teuton hordes, and later of the Germans under Ariovistus, when they tried to occupy Gaul; and it was near Mühlhausen, in upper Alsace, that Cæsar defeated that chieftain. Four centuries later came the Alamannians, and, though defeated at Strassburg by the Emperor Julian, by this route they subsequently passed over into Alsace. It is the strategic key to central Europe, and was recognized as such in 1870 when the Germans massed their forces to invade France. It is traversed to-day by railroads to Paris and Lyons, and by a canal from Montbéliard to Mühlhausen and Basel, connecting the Doubs and the Rhine. A similar pass is to be

found in the famous "Gates of Herat." The Hindu-Kush Mountains run off in the northwestern corner of Afghanistan, just north of Herat, into a ridge of low, grassy downs not more than nine hundred feet above the surrounding country, and through them flows the Heri-rud on its course from the plateau of Herat (2,600 feet) down to the low plains of Russian Turkistan.

Another order of pass, but allied to the last in its low elevation, is represented by the Brenner, which is a deep saddle in the eastern Alps, joining the Inn and Adige valleys. It is 4,460 feet above the sea, but only 2,760 feet above the foot of the pass where the Inn flows out into the Bavarian plateau, and thus forms the lowest line of communication across the Great Alps. The Brenner was the route by which the Cimbri came into the valley of the Po, and by which at a later date the Romans communicated with their possessions on the Danube and the upper Rhine. It was the road by which in the Middle Ages the armies of the German Emperor came to make good his claim on Italy. Through this gap Austria thrust her strong arm to keep her hold on the plains of Lombardy. By this road came the artists and artisans of the north country to learn the arts and crafts of beauty-loving Venice. From the Roman road-makers to the present railroad engineer, with all the concomitant civilization of each, the Brenner has seen the march of human progress. The Austrian Alps further east, dropping to a lower altitude while the ranges spread out, are crossed by many passes of slight elevation, like the Semmering (3,200 feet), through which was built in 1854 the first railroad over the Alps. These passes determined Rome's expansion to the Danube, just as later they exposed her to the inroads of the Goths and Huns.

Passes that reach a higher altitude than the Brenner can, for all practical purposes, be grouped together, though they may be distinguished in certain minor details of anthropogeographical interest. The Barogil Pass (12,000 feet), leading from the headwaters of the Chitral River over the Hindu-Kush to the Pamir, is a grassy plain, whither the nomads of the upper Oxus come to graze their cattle, and, according to one traveller, it might be crossed in a wheel wagon. The summit of the Little St. Bernard (7,420 feet), one of the easiest and earliest-known passes of the western Alps, is a pasture plain three miles long. A circle of stones here is supposed to mark the place of a council of war held by Hannibal while waiting for the stragglers to come up. By contrast, the Brèche de Roland (9,337 feet), in the Pyrenees, is a great portal, only 300 feet wide, in a ridge of rock forming the boundary between France and

Spain. Legend says it was cut through by Roland's sword, Durandal, to open a passage in pursuit of the Moors. And in far-away Persia we hear of the Shamsher bur Pass, or "Sword-hewn," held sacred as the work of Ali's sword, and one of the oldest and most frequented routes of northern Media.

When a mountain system consists of a single narrow range, it can be traversed by a single pass, like the Pass of Dariel over the Great Caucasus, or the Pass of Canfranc over the central Pyrenees. The same result follows where the summits of broader mountains also are approached by long, transverse erosion valleys which have been cut out from the heart of the system. The western Alps are completely dissected on the French side by the Durance, Drac, and Isère, so that the ridge of the system has to be traversed only at one point. In consequence of the ready accessibility of this range there were four established routes here in the days of the Roman Empire: I. The *Via Aurelia*, between the Maritime Alps and the sea. II. The *Mons Matrona* (Mont Genèvre, 4,100 feet), between the head stream of the Dora Riparia and that of the Durance, which was the best highway for armies. III. The Little St. Bernard, from Aosta, on the Dora Baltea, over to the Isère and down to Lugdunum (Lyons). IV. The Great St. Bernard route, which led northward from Aosta (*Augusta Præatoria*) over *Mons Penninus* to *Octodurus*, at the elbow of the upper Rhone, where Martigny now stands. In the central Alps the Romans used only the Brenner route, which, like the others mentioned, surmounted the Alps at a single pass and formed the ancient line of communication with *Augusta Vindelicorum* (Augsburg). They seem not to have known the St. Gothard, which, though higher than the others, is the summit of an unbroken ascent from Lago Maggiore up the valley of the Ticino on one side, and from Lake Lucerne up the Reuss on the other.

Mountains which spread out on a broad base with a succession of parallel ranges, and through which no long transverse valleys afford ready transit, must be crossed by a succession of passes determining more or less circuitous routes. The central Alps fall into such parallel ranges, divided by the longitudinal valleys of the Upper Rhone and Upper Rhine. Only by the great central dome of the St. Gothard, analogous to the Pamir, can they be crossed by one pass. Everywhere else the northern range must be crossed by some minor pass like the Gemmi (7,553 feet), or Panixer (7,907 feet), to the longitudinal valleys, and the southern range again by the Simplon (6,595 feet), San Bernardino (6,768 feet), Splügen (6,946 feet), or Septimer (7,582 feet), to the southern slope. The old

route from Augsburg to Milan followed the valley of the Lech south to the Kalk Alps, which it crossed by the Fern Pass to the valley of the Upper Inn, then led up this valley to the eastern boundary of the Grisons, where it turned south and by the Reschen-Scheideck (4,898 feet) crossed the central Alps; finally it traversed the southern Alps, by the Stilfser Joch, to the valley of the Adda and Lake Como. More circuitous still are the routes through the Austrian Alps, or the caravan road from Peshawar, in the Punjab, over the countless ranges of the Hindu-Kush to Balkh, in the plains of northern Afghanistan. The route leads through the Khaibar Pass, then along the gorges of the Kabul river, crossing several minor ranges, to the city of Kabul (5,740 feet); then, by the Unai Pass over the Paghman mountains into the valley of the Hilmend River, over the main range of the Hindu-Kush by the Hajikhak Pass (12,000 feet), or famous Gates of Bamian, from Bamian north by the Ak Robat to the Khulm river, which it follows down to the trading points on the Bukhara frontier. This road presents so many difficulties that caravans from Turkistan to India prefer another route up the valley of the Heri-rud to Herat, thence diagonally southeast across Afghanistan to Kandahar, and thence by the Bolan Pass southeast to the Sind. The successive ranges of the southern Appalachians necessitate a circuitous journey in crossing them; but their passes are in general broad, flaring water-gaps, resulting from the peculiar geodetic history of this section, and their spacious intermontane valleys afford natural highways, so that after the feet of the first pioneer had beaten a track over the eastern ranges, and Daniel Boone had blazed the Wilderness Road from Cumberland Gap to central Kentucky, the Appalachians presented no very serious barrier to the frontiersman.

Quite as important to communication as pass or gap, therefore, is the question of the avenue of approach to the same. This the transverse erosion valleys of mountains have always furnished. The stream determines the highway leading to the pass, and the length of the stream, generally speaking, determines the importance of the road. The passes in the Alps which are approached by deep re-entrant valleys are those that are crossed by railroads to-day: Mont Cenis, St. Gothard, and Brenner. The Canadian Pacific Railroad, utilizing such transverse valleys, runs from Vancouver eastward up the cañon of the Fraser river across the Cascade Range; then up the cañon of its tributary, the Thompson river, to Eagle Pass over the Gold Range; then up the Kicking Horse cañon to Kicking Horse Pass (5,240 feet), by which it crosses the Selkirk Rockies,

and then drops to the plains down the gorge of Bow river. The Northern Pacific Railroad uses the upper Missouri in western Montana in its ascent of the Rockies, and the Columbia for its passage through the Cascade Range. The Columbia and the Fraser cañons are not transverse valleys in quite the same physiographical sense as the others mentioned, but these rivers, like the Danube at the Iron Gate, sawed their way through a nascent mountain range as it slowly protruded its ridge.

But the regular transverse valley is the route from summit to plain, where it connects with a pass. The passes themselves have only emergency inhabitants—the monks and dogs of the hospice, the road-keepers in their refuge huts or *cantoniere*, or the garrison of a frontier fort or military colony, as in the Roman days, to hold these important thoroughfares. The flanking valleys of approach draw to themselves all the active life of the mountains. Here are concentrated commerce, population, and what scanty resources the barren upland may furnish. Their settlements have a similarity of location and physiognomy. Especially is this true of routes where there is no railroad line, and where no carriage-road has been constructed over the summit. The Alpine passes have gone beyond this stage of development, which, however, predominates in the Pyrenees. In the upper part of the valley, where the carriage-road ends and where the mule-path or foot-trail begins, we find a small settlement. Here the traveller can spend the night, rest his animal, and supply himself with what is necessary for the long, final ascent to the summit. Such places are Andermatt and Airolo on the St. Gothard route, Chamouni on the Tête Noire, Courmayeur, and a dozen others well known to the tourist in Switzerland.

A little further down the valley the type changes. Here the main valley develops a point where side valleys converge, each one of which in turn may lead to passes. Such a point necessarily becomes a focus of life and of trade, because it is a natural distributing centre for commodities destined for the highland inhabitants. Chiavenna, at an altitude of 1,090 feet, is situated just above the head of Lake Como at the junction of the Mera and Liro valleys, the first of which leads north by the Splügen Pass to the Hinter Rhine, and the second east by the Maloja Pass (5,940 feet) to the headwaters of the Inn just above St. Moritz. The town has a population of about 4,000. Such a point is Aosta (1,913 feet), on the Dora Baltea, in northwestern Italy. It controls the great St. Bernard (8,120 feet) and the less important Col de Fenêtre (8,856 feet) leading north to Martigny, on the Upper Rhone; and the

Little St. Bernard highroad to the Isère, together with the Col de la Seigne and Col du Bonhomme road, to the Val Montjoie and the valley of the Arve. Aosta has now a population of 8,000. It was an important place in the Roman period, as the existing antiquities testify. The location of Bellinzona, in northern Italy, makes it the centre of radiating lines of communication. It commands two railroad lines, one of which leads southeast to Milan, the other south to Genoa; and is the converging-point of four Alpine routes—the St. Gothard to Lake Lucerne, the Lukmanier Pass (6,290 feet) to Disentis, on the Upper Rhine, the Greina Pass (7,743 feet) to Ilanz just below, and the San Bernardino to the Hinter Rhine and Coire. Bellinzona has now a population of 2,500. In the Middle Ages it was strongly fortified by the Dukes of Milan, and was regarded as the key to the route between Lombardy and Germany. But one of the most remarkable situations of this kind is to be found in northeastern Afghanistan, at the southern foot of the Hindu-Kush. The village of Charikar, near the confluence of the Panjshir with the Ghorband, a northern tributary of the Kabul river, is the converging-point of eighteen passes over the Hindu-Kush, and probably occupies the old site of *Alexandria ad Caucasum*. Kokan, commanding the approach to the passes of the western Tian-Shan and the northern Pamir, is an important place in point of population, civilisation, and trade. Its bazaars are very active, and are the best-stocked in Russian Turkistan, with goods from Europe, Persia, and India.

Important points for towns are found also where transverse valleys intersect longitudinal valleys. Innsbruck is the capital of the Tyrol, because it controls the Brenner and also a western route up the valley of the Inn and across the Arlberg Pass (5,994 feet) to Lake Constance. Further south, Brixen lies at the junction of the Brenner and Pusterthal, which leads directly east to the valley of the Drave and the Danube. The importance of the Pusterthal and the Arlberg is evidenced by the fact that they are now traversed by railroads. The Furka Pass (8,150 feet), which connects the valleys of the Upper Rhone and the Upper Rhine very near where the central mass of the Alps is crossed by the St. Gothard road, lies too high for any town to develop here; but the streams which it connects present a long line of villages, representing a series of passes over the northern and southern ranges, just as do the villages of other longitudinal valleys of the Alps, like the Inn, the Adda, and the Mur. Where the Upper Rhone leaves its great longitudinal valley and bends at a right angle northward to Lake

Geneva, we have the town of Martigny (Roman Octodurus, 1,558 feet elevation), which commands, besides the routes up and down the Rhone valley, a number of passes south over the Pennine Alps to Italy, and over the western range to Savoy. The location of Martigny is duplicated in that of Coire (Curia), at the elbow of the Upper Rhine, with its connection by river north to Lake Constance, south by five passes (Julier, Septimer, Splügen, San Bernardino, and Lukmanier) to Italy, and southeast by the Albula and Flüela passes to the Engadine. Though situated at an altitude of 1,936 feet, Coire has a population of about 9,000. All such towns are distinctly mountain settlements; they are centres of mountain life, and their importance is due to the routes of highland travel they control.

(*To be continued.*)

MAP NOTICES

BY

HENRY GANNETT.

During the past six months the U. S. Geological Survey has issued thirty-five new sheets, scattered over the country, and illustrating widely differing topographic forms and degrees of culture.

In Maine are two sheets, Orland and Bucksport, both in the southeastern part of the State. They are upon a scale of 1:62,500, with a contour interval of 20 feet, and represent a diversified country, covered with rounded, irregular hills, with scattered lakes.

In New York are three sheets—Dryden and Watkins Glen, situated upon either side of the Ithaca sheet, and Macedon, situated upon the shores of Lake Ontario. These are upon the same scale and have the same contour interval as the other sheets of the State, viz: 1:62,500, and 20 feet. The Watkins Glen sheet is interesting in the fact that it represents the southern part of Seneca Lake, showing it to have the form of a glacial gorge, with straight parallel walls rising steeply from the water to an altitude of 300 to 400 feet above it. A level valley, with a horizontal bottom, extends three miles, with an almost imperceptible rise from the head of the lake southward. Streams flowing into the lake have as yet, in most cases, cut but very slightly into its walls; but Watkins Glen is a water-worn gorge, cut sharply to a depth of between 300 and 400 feet.

The results of the co-operation between the State of Pennsylvania and the United States Geological Survey are illustrated in the form of five sheets, all toward the western part of the State. These are upon a scale of 1:62,500, with a contour interval of 20 feet. Girard lies in the northwestern part of the State, bordering upon Ohio and Lake Erie. Gaines and Elkland are in the northern part of the State, including portions of Potter and Tioga counties. They are excellent examples of the dissected Allegheny plateau. Masontown and Uniontown lie in the southwestern part of the State, and include portions of Fayette and Greene counties. They also represent portions of this plateau, but not as characteristic

samples of it. They include much of the Connellsburg coke region.

The Rancocas sheet, of New Jersey, upon a scale of 1:125,000, with a contour interval of 10 feet, is a reduction of four sheets of the original map, and represents a part of the level Atlantic plain in the eastern middle portion of the State.

The Oakland sheet, comprised mainly in Maryland, is upon a scale of 1:62,500, with a contour interval of 20 feet, and represents a portion of the Allegheny plateau in the western part of that State.

Co-operation with the State of Ohio has resulted in producing four sheets, all on a scale of 1:62,500, with a contour interval of 20 feet. Two of these, East and West Columbus, represent the capital of the State, with the surrounding country, a region almost without relief, and traversed by well-graded streams. In the northern part of the State we have the Toledo and Maumee Bay sheets, adjoining each other, representing a region almost as level as it is possible to imagine, rising gradually to the south and west from Lake Erie.

In Indiana is one sheet, Tolestion, situated southeast of Chicago, on the shores of Lake Michigan.

The St. Croix-Dalles sheet, in Wisconsin and Minnesota, on a scale of 1:62,500, with a contour interval of 20 feet, represents a region covered with glacial drift, forming irregular hills, and dotted with numerous lakes and ponds.

In North Dakota is one sheet, Pingree, upon a scale of 1:125,000, with a contour interval of 20 feet. The region represented is nearly at the source of James River, or Dakota River (as it should be by United States statute), a country of slight relief, covered with glacial debris, and with many depressed areas, a region in which the drainage system is still infantile.

In South Dakota are two sheets—one Canton, in the southeastern part of the State, representing a recently glaciated country, level, with few streams, and those of slight grade; the other sheet is the result of a re-survey about the city of Deadwood. It is on a scale of 1:125,000, with a contour interval of 100 feet, and lies in the northeastern part of the Black Hills.

In Nebraska are two sheets, Ogalalla and Paxton, adjoining each other. They are upon a scale of 1:125,000, with a contour interval of 20 feet, and represent the valleys of the North and South Platte Rivers. The former is a large stream, carrying at all times of the year a considerable volume of water; the latter is,

during most of the year, little more than a bed of sand. The narrow strip of country separating the two rivers shows a curious northwest and southeast trend, which is especially marked upon the Ogalalla sheet. North of the North Platte the country is extremely sandy, all the relief being produced by sand-hills.

In Arkansas is one sheet, Fayetteville, situated in the northwestern part of the State. It is on a scale of 1:125,000, with a contour interval of 50 feet, and shows a low plateau highly dissected.

In Indian Territory are six sheets, all upon a scale of 1:125,000, with a contour interval of 50 feet. Four of them—Canadian, Okmulgee, Wewoka and Vinita—lie in the northern half of the Territory, and show a country of little relief, and that little presenting no decided characteristics. The other two, Sallisaw and Winding Stair, are in the eastern part of the Territory. Arkansas River traverses the former a little north of its middle, while the southern half of that sheet and all of the Winding Stair represent the characteristic crooked ridges of the Ozark Mountains, alternating with broad valleys, and cut by frequent water-gaps.

In Texas is one sheet, Flatonia, upon a scale of 1:125,000, with a contour interval of 25 feet. This is situated in the southern part of the State, and represents a country of little relief, and almost without flowing water, with the exception of Colorado River, which crosses its northeast corner.

In Wyoming are two sheets, both in the Bighorn Mountains. They bear the names Bald Mountain and Cloud Peak, and are on a scale of 1:125,000, with a contour interval of 100 feet. The former shows the western rim-rock of the Bighorn plateau, and in the northeast a bit of the eastern rim-rock, thus showing a broad section across the plateau. These rim-rocks, which are composed of stratified beds tilted up against the mountains, still have nearly as great an elevation as the summit of the plateau, erosion having as yet made but little progress in degrading them. In many cases the lower rocks composing the rim-rock lie in place across, or nearly across, the plateau. Thus, beds of Cambrian strata still cover great areas of the summit of the plateau, while in other places erosion has exposed the granites. A partial section of the range or plateau is shown in the Cloud Peak sheet. Here the western rim-rock crosses the western part of the sheet, but the eastern rim-rock is beyond its limits. A little east of the middle of the sheet rises out of the plateau a high mountain range, reaching in Cloud Peak, the highest summit, an altitude of 13,165 feet. This range is of granitic rocks, and has been extensively glaciated; indeed, four

small glaciers still exist in the immediate neighborhood of Cloud Peak, while everywhere are cirques, glacial gorges, lakes and hanging valleys.

In California are two sheets. Tujunga, upon a scale of 1:62,500, with a contour interval of 50 feet, lies immediately north of Pasadena, and includes part of the northern side of the San Gabriel Range, an extremely rugged granite mass, with a maximum altitude within this area of about 7,000 feet. The other, known as Elsinore, is on a scale of 1:125,000, with a contour interval of 100 feet. It lies south of San Bernardino, and includes the city of Riverside in its northwest corner. It represents a valley region, interspersed with bare or chaparral-covered hills of no great altitude.

THE DEPARTMENT OF THE INTERIOR OF CANADA has recently issued a map of the Dominion, upon a scale of 100 miles to 1 inch, showing drainage, boundaries, and other cultural features consistent with the scale. It is a convenient map for general reference, being, presumably, brought well up to date. The interesting feature of the map to people of this country is the position given to the Alaskan boundary from Mount Saint Elias southeastward. It is represented as including Revillagigedo Island and all the country to the eastward in Canada; hence the line closely borders the coast, cutting off the fords, and, in defiance of the *modus vivendi*, crosses Lynn Canal and Glacier Bay midway of their length, follows apparently the crest of the Fairweather Range, and crosses Yakutat Bay below the bend.

ATLAS OF THE PHILIPPINE ISLANDS. PUBLISHED BY THE U. S. COAST AND GEODETIC SURVEY, AS "SPECIAL PUBLICATION NO. 3." —The maps of this atlas were prepared from surveys by Spaniards and Filipinos, under the direction of P. José Algué, Director of the Observatory of Manila, and presumably they embody the fullest information obtainable at the present time concerning this group of islands. The atlas contains, besides a general map of the Pacific, general maps of the islands, showing their provinces, the distribution of peoples, the distribution of volcanic phenomena, together with depths of the neighboring seas, the distribution of meteorological and seismic observatories, and the distribution of earthquakes. These general maps are followed by 24 maps, showing the islands in some detail. Upon them the provinces, or departments, are represented in different colors, the drainage and the sea in a blue tint, and the relief by crayon shadings. Among these

maps are scattered detailed sketches of harbors, volcanoes, and other features of special interest upon still larger scales.

This atlas furnishes, in convenient form for reference, probably the best maps of the islands to be obtained.

The maps are lithographed by Hoen & Co., of Baltimore, and are an excellent specimen of that firm's work.

The atlas is preceded by a geographic description and a dictionary of names. This latter has been provisionally adopted by the U. S. Board on Geographic Names, and its publication will go far toward unifying spelling and usage.

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NOTES ON GEOGRAPHICAL EDUCATION.

BY

RICHARD E. DODGE.

THE STATISTICAL AND THE GEOGRAPHICAL POINTS OF VIEW IN ECONOMIC GEOGRAPHY.—PROFESSOR JEAN BRUNHES*, OF THE UNIVERSITY OF FREIBURG (SWITZERLAND), has recently printed a very excellent paper on the point of view that ought to obtain in the study of economic geography, if the work is to be really geographical.

The paper opens with a consideration of how a teacher may present economic geography merely from the statistical side without attempting to show any of the geographical principles that have helped in bringing about the geographical conditions. On the other hand, the author pleads that in all work, no matter how elementary, a certain amount of statistics, expressed in round numbers, be included. He then goes on to explain how statistics should be used in the form of averages representing the geographical conditions of a country in reference to rainfall, population, products, etc., and emphasizes the fact that a true average is not found by averaging extremes. For instance, one cannot estimate accurately the productiveness of a country from a statement of the annual rainfall in gross amount. The geographer needs to know more than this; he needs to know the average per month, so as to know whether the rainfall is sufficiently well distributed during the growing season. Several other pertinent illustrations are worked out in a similar way.

Emphasizing the value of making generalizations rather than learning scattered facts, the author urges strongly that not only the principle, but the process of getting the principle, is important, because the statistics are destined to be out of date before the pupil has reached man's estate.

In the latter part of the paper the writer outlines the field of physical geography, of political geography, and economic geography. He shows how physical geography should be organized from

* Jean Brunhes, *Differences psychologiques et pédagogiques entre la conception statistique et la conception géographique de la géographie économique*. *Études Géographiques*, 1, 4, Institut Géographique de l'Université de Fribourg (Suisse), 1900.

the causal standpoint, and how political geography should not be considered as determined, but rather influenced, by the physical condition of a region. Taking the distribution and production of cotton as an illustration, the author analyzes the facts in great detail, and shows how the knowledge of the present economic conditions of cotton demands a knowledge of the physical and political geography of the cotton-growing areas. In conclusion, Professor Brunhes urges the method of research—the scientific method in all economic work in geography in all stages of the study.

This paper is a very suggestive and well-ordered contribution to a subject that seriously lacks organization at the present time. Commercial and economical geography are in the air, and the attempts at organization are many, but thus far nothing permanent and usable has been perfected, at least for secondary and commercial schools. The article in question should be read by all students of the subject, for it is valuable, not only in itself, but also for the many excellent references it contains.

THE SCHOOL OF GEOGRAPHY AT THE UNIVERSITY OF OXFORD.—The *Geographical Journal* and the *Scottish Geographical Magazine* for March both present interesting and instructive accounts of the School of Geography at Oxford University during 1900. The attendance during the year has been very promising, though there is much left to be perfected before the school work may be wholly satisfactory. The attendance varied from 100 in the Michaelmas term to 16 in the Easter term, including many women. By far the larger number attended the lectures only, and particularly the lectures devoted to historical geography, and took none of the laboratory work. Indeed, the numbers attending the laboratory instructions were 6, 4 and 5 in the three terms. Such a division of interest shows strikingly the point of view in reference to geography held largely in Great Britain, and the contrast with the University geography work in the United States.

The courses of lectures given, furthermore, are not as continuous or as intensified as are University courses in geography in this country, as is shown by the number of lectures devoted to the several subjects treated. We find the shortest series a group of five lectures, given to the Natural Divisions of the Old World, and the longest one of sixteen lectures on the Atmospheric Circulation and the Historical Geography of Greece and the Greek World. Six series were given in the field of physical geography and six more in historical geography. In the latter, besides the course noted above,

are the following: The Development of Geographical Ideas (7 lectures); The Historical Geography of the British Isles (7 lectures); that of the Romance and Teutonic Countries of Continental Europe (14 lectures); that of North America, Australia, and the Cape (14 lectures); The Geographical Development of the Roman Empire (8 lectures). The laboratory and field exercises were devoted to cartography, field surveying, the study of maps, terrestrial magnetism, etc.

About \$1,100 have been spent on equipment, and the school has, fortunately, received many valuable donations in the way of publications and maps. The scholarship of £60 was awarded in October to Rev. E. C. Spicer, of New College. The scholar must study a year in the school, with a view of obtaining the diploma, the scope of the examination for which was outlined in this BULLETIN for October, 1900, p. 352.

OUTLINES FOR LOCAL FIELD EXCURSIONS IN GEOGRAPHY.—Those teachers in secondary schools who desire to conduct field excursions in geography are frequently handicapped by their lack of acquaintance with the possibilities of the local field, and are in need of outlines that will suggest not only localities that may be used for the illustration of certain phenomena, but the means of getting to the localities and the practical difficulties that may be favorable or unfavorable to the conduct of excursions. At the last annual meeting of the New York State Science Teachers Association Professor W. M. Davis, of Harvard, urged strongly the preparation of such outlines for various centres.

Good illustrations of the possibilities along these lines are presented in two small circulars that have recently appeared outlining helpful field trips that may be undertaken about Brockton and Springfield, Massachusetts.*

The first of these pamphlets opens with a brief consideration of the geography and geology of Brockton, with references to the literature of the area. Following these are listed twenty-eight different localities, with brief statements of the principal objects to be seen there. Each locality is then considered in detail, with pertinent and suggestive questions that not only bring out the

* The Fields of Brockton: Notes for Field Study in Geography and Geology, by Mark S. W. Jefferson, Brockton Public Schools.

An Outline of Eight Excursions for the Study of the Physical Geography and Geology of Springfield and Vicinity, by William Orr. Published for the Springfield Geological Club by the City Library Association, 1901.

problem of the areas, but also suggest the method of field work to be followed. Several sketch maps are included, and the pamphlet closes with an index showing at which localities various topics may best be illustrated.

The pamphlet by Mr. Orr opens with an outline of important features of the vicinity of Springfield, considered under the following heads: The Upland Area of Crystalline Rocks; The Broad Valley Floor of Sandstone; The Trap Rock Area; The Glacial Deposits; The Epoch of the Glacial Lakes; The Terrace Formation. References are given to the available literature.

Following this introduction are the outlines of eight field excursions, in each of which directions are given for reaching the area, and a good account of the principal points to be seen is included. Certain of the localities are illustrated by good half-tones, and the pamphlet as a whole is very attractive in its appearance.

Such outlines as these are in the right direction, and should be very valuable in giving an impulse to field excursions in the localities concerned, and certainly stand as excellent guides in a much-neglected field.

GEOGRAPHY IN THE ELEMENTARY SCHOOLS.—The United States Commissioner of Education, W. T. Harris, has recently published a short but very suggestive paper entitled *Geography in the Elementary Schools*. This article has been widely printed in the educational papers, and should be generally read and assimilated by the elementary school teachers. The paper is a plea for a place for a well-ordered geography in the school curricula, and is an argument against the validity of the severe criticism of some students of educational problems, that geography is a chaos and not a composite, and hence, perhaps more harmful than helpful to children.

Commissioner Harris believes that geography, when well taught, is more capable than any other branch of arousing in a child a thirst for knowledge, of giving a many-sided interest, and of giving him the general habit of looking upon one fact as an explanation of another.

The further claim is that geography, when well taught, is a corrective of superstition, as it substitutes for imagination insight into causal relations and for fancy, thought.

In answer to the criticism that geography is too composite, the author emphasizes the fact that the child's experience is composite, and that hence no subject that was not composite could make the best use of the child's experience and lead him to order his knowl-

ledge—in other words, could give him the beginnings of the scientific method. He further urges that geography is the one subject that unites the child to his environment, and hence, that geography in schools should not deal with the mere physical features, or, on the other hand, with the distinctly human side, since

Geography unites the study of the natural elements—land and water, climate and productions—with the study of man's present conquest and use of the same.

And, again, that geography is no more a composite than is any other subject; that in all education the pupil begins with the composite and goes toward the simple by analysis.

The points that Commissioner Harris makes in reference to geography teaching are just those long advocated by leading experts in the field. Coming as they do, however, from one who has the universal esteem and honor of the teachers of the country, they ought to be of material assistance in promoting good geography work in elementary schools.

THE ORGANIZATION OF GEOGRAPHY.—Professor Charles R. Dryer, of the State Normal University, Terre Haute, Indiana, presents in the January number of the *Educational Review* an article entitled *The Organization of Geography*, the first part of which is a scholarly and helpful presentation of most modern and accepted points of view in reference to the scope of geography. Opening with a brief account of the development of geography and the work of Humboldt, Ritter, and Peschel, the author passes on to a consideration of the field of geography, which is generally recognized as including the following topics:

(1) The earth as a planet: its form, dimensions, motions, and relations to the sun. This is the astronomical phase of the subject, and its method is mathematical.

(2) The land: its outline and relief, the origin and development of its surface forms, and the materials and structure of the earth crust so far as necessary for the explanation of surface forms. This is the geological phase of the subject, and has recently developed into large proportions, forming the new science of geomorphology.

(3) The sea: its form, floor, volume, and contents, and the properties and movements of sea-water.

(4) The atmosphere: its properties, conditions, and activities, and their results as manifested in climate. It is in this department that geography is most dependent upon physics.

(5) Plants and animals: their distribution as dependent upon environment. This is the biological phase of geography.

(6) Man: the distribution and movements of population; human conditions, industries and occupations as determined by land and water, relief and climate, natural resources, and economic products. This forms the physical basis of history, sociology, and economics.

Taking up the element of distribution as being the keynote of geography in a broad sense, the author quotes the accepted definition of geography, as used in Europe, and shows that distribution is considered as important in all branches of geography, though somewhat in abeyance in the discussion of land forms.* Though geography must take into account the causal relations in the distribution of many different factors, it is not yet clear to all, as the author shows, which one should be used as the basis for the organization of the subject. In America the Ritterian idea of the earth as the home of man still holds to a certain extent, though, as Dr. Dryer says:

"The scientific geographers of to-day no longer attempt to discover how the earth has been fitted for the home of man, but, first, how all the elements and forces of nature combine and interact to produce the present conditions of relief, climate, and life; second, how man has gradually, and still imperfectly, become adapted to these various conditions.

The scientific organization of the subject in the school field is yet far in the future, though great advances have been made in the last ten years, especially through the work of the well-known texts of Frye, Redway and Hinman, and Tarr and McMurry.

Though it is universally recognized that both the human and the physical elements are essential in school work in geography, the efforts that Dr. Dryer outlines are but a beginning along rational lines. There are so many elements involved, varying from the conservatism of parents and school boards to the over-ambitious and somewhat premature attempts of geographers to bring about the millennium, that the problem is still one of the greatest in the school field. With, however, the generally accepted opinion as to the scope and method of geography there should be no retrogression. Advance by the specialists at just the rate to encourage and spur on the teachers will bring about an organization of geography in the next decade perhaps greater and probably more permanent than some of the attempts of the last decade. Here is the problem to which teachers, geographers, and book publishers should devote their best united attention.

SCHOOL COURSES OF STUDY IN GEOGRAPHY.—Two very successful courses of study in geography have recently appeared and deserve

* See also *Editorial* in *Journal of School Geography*, February, 1901, pp. 63-64.

attention as showing the current point of view in geography work in different parts of the country. The first is the course planned for the City and County of San Francisco,* and the second is the course in operation in the Horace Mann Schools of Teachers College, Columbia University, New York City.† These two courses have many things in common, and yet show many differences, not merely in details, but in the point of view recognized by the authors as pertinent to school work.

In each case the movement is from the home outward to the larger features of the world, though the method followed and the time of treating such topics as a special study of the United States are different. The second course differs from the first, inasmuch as the essential features of physical geography are introduced gradually and so applied that there is no call for a special course in physical geography in the elementary schools.

The San Francisco course contains many helpful suggestions to teachers as to the best ways to enliven their work with topics of interest from the daily news, etc., and includes a brief series of references to the better books.

The Horace Mann School Course is much more detailed in presenting the essential facts of each year, and contains a certain amount of discussion of the reasons for the order as presented, and includes a carefully selected series of references for teachers and pupils. This course also presents a detailed outline for a High School course in physical geography, intended to cover the ground required for candidates for the entrance examination in physiography at Columbia University.

The first course is planned for the public schools, with varied conditions of work, and the second for a large private school, where the conditions are particularly favorable. Each course is deliberately and carefully planned to secure the best amid the conditions at hand, and ought to be of help to progressive teachers generally.

*Courses of Study for the Public Schools of the City and County of San Francisco, Cal., 1901, pp. 106-142. The Murdock Press, San Francisco.

†Geography in the Horace Mann Schools. Teachers College Record, Volume II, No. 2, March, 1901, pp. 63-164.

NOTES ON CLIMATOLOGY.

BY

ROBERT DE C. WARD.

THE DEPOPULATION OF KANSAS, NEBRASKA, AND COLORADO.—One of the most pathetic incidents in the history of the settlement of our country west of the Mississippi River was that connected with the sudden increase in the population of portions of that region about fifteen years ago, and the suffering and impoverishment which the new settlers had to face in the succeeding years. During the period from 1886 to 1889 there was a sudden "boom" in western Kansas and Nebraska and eastern Colorado, resulting from a large increase in land values which followed a succession of unusually rainy seasons. There was a very rapid gain of population, stimulated somewhat—how far it is impossible to determine with accuracy—by dishonest representations of the climatic conditions made by unscrupulous land-dealers. The increase in population in Kansas has recently been considered by Gannett (see this BULLETIN, No. 5, 1900), who has shown that in 1885, at the beginning of the "boom," Kansas had a population of 1,268,530, while in 1888, near the crest of the "boom," the population numbered 1,518,553. A number of dry seasons followed, and the new settlers were literally starved out. In the midst of much suffering, the country was quickly depopulated again. In 1890, the population of Kansas had been reduced to 1,427,096; and in 1895 it was only 1,333,734. The State thus gained nearly 250,000 inhabitants in three years, and later lost nearly 200,000. Similar conditions obtained in the two Dakotas. This exodus of most of the new "boom" settlers naturally resulted in the abandonment of villages and farm-houses everywhere over this district, and one of the most pathetic sights which the traveller may look upon to-day, in his journey across the region from the 100th meridian to the foot-hills of the Rocky Mountains, is the abandoned and ruined house, or farm, or stable, built in the days of the "boom," when prospects were of the brightest, and left when the family was forced to go because the deficiency of rainfall made it no longer possible to live there. A graphic description of the present aspect of the "boom" country is given by J. E. Payne in BULLETIN 59, December, 1900, of the Agricultural Experiment Station of the Agricultural College

of Colorado, under the title *Field Notes from Trips in Eastern Colorado*. Of many of the towns which sprang up like mushrooms, and aspired to become large cities, railroad centres, or county seats, there are to-day left only a few cellars and two or three scattering houses. On the site of Arickaree City one store building now stands, and is the home of four persons, while the Arickaree post-office is on a ranch eight miles away. In the neighborhood of Lindon nearly all the land for miles around was once taken up, while to-day one may drive for ten or twenty miles without seeing a house:

"The site of old Lindon is now marked by a few heaps of earth and a few holes in the ground. . . . At Harrisburg, one family still lives. Thurman, also called Stone City, once had two banks, and two railroads were surveyed through it during 'boom' times. Now one family lives in Thurman. But a colony of hardy Mennonite farmers still holds claims near enough together to make lanes necessary. Two lanes cross at Thurman post-office."

The farmers who are now living in the region have come to see that there is not enough rainfall for successful agriculture. They have turned their attention chiefly to stock-raising, but usually also raise some grain, and always manage to produce enough rough forage for their cattle. Thus, after the "boom" and the futile attempt to turn the debatable ground west of the 100th meridian into a farming country, the possibilities of the region, under the control of climate, have come to be clearly recognized. The future will see no more of those pathetic struggles on the part of man to claim solely for agriculture a region which the climatic control has decreed shall be chiefly a grazing country.

THE DISTRIBUTION OF RAINFALL OVER THE LAND.—In 1882, Loomis published the first good map of the mean annual rainfall of the world. This appeared in the *American Journal of Science*, Third Series, Vol. XXIII, Jan., 1882, under the title *Contributions to Meteorology, Sixteenth Paper*. In January, 1883 (*Amer. Journ. Sci.*, 3d Series, Vol. XXV), a second edition of the same map appeared, as the eighteenth paper of the *Contributions to Meteorology*. Loomis's map was used by Hann in his *Atlas der Meteorologie* (Berghaus' Physikalischer Atlas. Abtheilung III. Gotha, 1887), and a revised form of it was published by Buchan in the *Scottish Geographical Magazine* for 1887. In 1889, Loomis himself published a revised form of his original map in Chapter III of the revised edition of the *Contributions to Meteorology*. In 1898, Supan brought out a new map of mean annual rainfall, and four charts showing the rainfall of the four seasons (*Die Verteilung der Niederschläge auf der*

festen Erdoberfläche; Petermanns Mitteilungen, Ergänzungsheft No. 124. Gotha, 1898), and Dr. A. J. Herbertson also published a new map of mean annual rainfall. The latter is reproduced in Bartholomew's *Atlas of Meteorology* (1899).

The most complete of all publications on rainfall, as well as the latest, is the recent one by Dr. Herbertson, of the School of Geography at Oxford University, entitled *The Distribution of Rainfall over the Land* (Roy. Geogr. Soc., London, 1901. Pp. 70. Maps 13. Pl. I). Dr. Herbertson has for the first time drawn *monthly* rainfall maps for the world. In doing this he has gone ahead of all previous students of the subject, and has made one of the most important contributions to meteorology of recent years. These monthly rainfall maps were reproduced, on a small scale, in the *Atlas of Meteorology* (1899), but are far more useful on the large scale of the present publication. Dr. Herbertson rightly points out that seasonal rainfall maps are unsatisfactory, for the value of the seasons as a basis for constructing maps of this sort differs greatly in different countries, and three months are often too long a period to illustrate the seasonal peculiarities of rainfall.

The maps contained in *The Distribution of Rainfall over the Land* show the lines of equal rainfall for 25, 50, 100, 200, 300 and 400 mm. The differences in the lengths of the months are allowed for, the actual values used for the isohyetal lines being the nominal values multiplied by the number of days in the month, and divided by one-twelfth of the number of days in the year. Thus, the lines on the February map marked 100 mm. really represent an actual rainfall in February of 92 mm. Every isohyetal line has, therefore, two meanings. The value given on the map is that for the month reduced to one-twelfth of a year. The same line represents an actual rainfall during that month somewhat less or more than its nominal value, according to the length of the month. The maps are colored in seven different shades or colors. There are five shades of the conventional "rainfall" blue, one of a lightish pink, and one of a light brown. There is a separate discussion of the distinctive features and peculiarities of the rainfall of each month, the earth's surface being divided, for the purpose of systematic description, into three regions, viz: the sub-equatorial baric trough or depression; the constant or steady or trade-wind system of winds, and the north and south temperate storm-wind systems.

Dr. Herbertson's valuable series of charts, and his brief but pointed discussions of them, make a much more detailed study of the world's rainfall possible now than ever before. This monograph is assured a hearty welcome and effective use. The bibliography

at the end of the report, of general works and publications on special areas, adds materially to the value of the paper.

THE CLIMATE OF THE ARGENTINE REPUBLIC.—Of the South American republics, Argentina is far and away the foremost in point of view of organized meteorological work. The Argentine meteorological service was inaugurated by the late Dr. B. A. Gould, and has, under the present able directorship of Mr. Walter G. Davis, attained a high rank among the weather services of the world. Volume after volume of meteorological tables and discussions have been sent out from the Meteorological Office at Córdoba. As the number of stations has been increased year by year, and more and more data have been collected from the sparsely settled portions of the country, the material has rapidly been accumulating for a complete climatologic study of Argentina. Such a study—an admirable one in every way—has recently been published as a part of the second census of the Argentine Republic (Buenos Aires, 1898. Tomo I. Cuarta Parte. *El Clima de la República Argentina, por Gualterio G. Davis*, pp. 259-381). Unfortunately, this report is, for all practical purposes, buried. No reprints of it have been struck off, and it is still unknown to meteorologists at large. Mr. Davis has, in his monograph (which is one of the most important climatologic publications issued in recent years), given an excellent presentation of the chief climatic features of Argentina. The country itself, because of its great north and south extent, is an extremely interesting one, including, as it does, a great variety of climates between its northern boundary, beyond the Tropic of Capricorn, to its southern extremity, at latitude 55° S. Great differences of temperature and precipitation naturally occur over this extended territory, and the products of the soil and occupations of the people vary with the varying climatic conditions. All the important elements of the climate are tabulated and discussed. A large number of graphic representations show the correlations between these various elements at some of the more important stations. Finally, a series of charts, based on the latest and most complete data available, shows the temperature, pressure and winds for the four seasons and for the year, and the mean annual rainfall. These charts show, for the first time, the distribution of these elements over this southern portion of South America, in detail, and on the basis of the reliable data collected by the Argentine Weather Service. A reprint of Mr. Davis's monograph in Spanish or, better still, in English would be a welcome addition to the meteorological libraries of the world.

ABSTRACT OF AN ADDRESS BY MR. E. WHYMPER.

"TWENTY THOUSAND FEET ABOVE THE SEA."

In the discourse which was delivered by Mr. Edward Whymper on November 13th, 1900, to the American Geographical Society, he pointed out that the initiation of mountain-climbing and mountain-travel in Europe was due to the young Genevese Professor of Philosophy, Horace Benedict de Saussure, who offered a considerable reward in 1760, and in later years, to any one who would discover a practicable way to the summit of the great Mont Blanc. The earliest attempts to ascend the mountain were made from the Valley of Chamonix; then others were made by way of the Val Montjoie, and ultimately the summit was gained from the original direction.

Mr. Whymper then proceeded to show the manner in which mountain-climbing is practised at the present time, and illustrated this part of his discourse with an extensive series of lantern-slides, showing mountaineers at work upon rock, snow and ice, climbing and cutting, ascending and descending, and crossing snow-bridged crevasses, etc., etc. He laid stress upon the value of rope to mountain-climbers (when it is properly used), and, while paying homage to the courage and enterprize of the early mountaineers, expressed the opinion that it was surprising they did not more often come to grief, through their complete ignorance of everything that might occur to them above the snow-line. He particularly insisted upon the importance of mountaineers acquiring a mastery of the art of balancing, and upon the necessity of their keeping upon their legs; and emphasized his remarks by referring to the catastrophe which occurred upon the first ascent of the Matterhorn through the inability of one of the party to maintain his balance. When he was in a position where a slip meant almost certain death, he lost his footing and his life, and caused the death of three of his comrades.

The lecturer then passed on to speak of the foundation of the Alpine Club (the parent of a number of similar institutions which have now been established throughout the world, embracing more than 100,000 members), and of the competition which was displayed by its associates, soon after its foundation, in scaling the then untrodden summits of the highest Alps. "By the year 1865

scarcely any of the principal peaks remained unascended." A superb series of views of the highest Alps was shown in illustration, and it was pointed out the rule is that all mountains have an accessible side, and one side which is apparently or obviously easier to ascend than all others. "In 1865, one mountain in the Alps—one of the greatest—remained unascended, which was an exception to this rule. The peerless and incomparable Matterhorn is a mountain which is almost *unique* in appearing nearly equally inaccessible upon *all* sides, no matter the direction from which it may be regarded;" and this was demonstrated by means of a magnificent set of lantern-slides, taken from nearly every point of the compass.

Mr. Whymper next gave a sketch of his (the first) ascent of this mountain, and said that the earliest efforts to scale it were made from the south-west, as that side, from being much broken up, appeared to offer some chance of success. It was not until after he had made nine different attempts to scale it from the south and south-west side he began to entertain the opinion that an easy and natural way to the top would be found over the northeastern face, although that was one of the sides which appeared to be hopelessly inaccessible; and he explained in the following passage why he was led to entertain this idea. "I had noticed," he said, "that the main mass of the mountain was composed of regularly stratified rocks, dipping to the south and west; and that, in consequence of this, on the south side, the exposed surfaces were frequently (or generally) slabs of rock sloping *downward* and *outwards*, with their fractured edges often actually overhanging. This caused much of the difficulty in climbing the southern side of the mountain. I inferred that, if the same structure extended right through the peak, the great northeastern face, instead of being hopelessly inaccessible, would be quite the reverse—that, in fact, it would be a great natural staircase, with steps inclining *inwards*; and, if that was so, its smooth aspect would be of no importance, for the smallest steps, inclined in that fashion, afford good footing. *This deduction was the key to the ascent of the Matterhorn.*"

After giving an account of this ascent, the lecturer passed on to his two ascents of Chimborazo, in the Republic of Ecuador. Although Humboldt, Boussingault, and many others had endeavored to reach the summit of this great mountain, Mr. Whymper was the first to succeed in doing so, in 1880, and his ascents are the only ones which have been effected down to the present time. In making this expedition several objects were kept in view, and first amongst

them was the study of what is called "mountain sickness," a term which is employed indiscriminately for the various affections which occur to human beings at great altitudes. These effects differ in different individuals, though they are all primarily due, according to Mr. Whymper, to the diminution in atmospheric pressure which is experienced as one ascends. In the case of himself and of his party no unpleasant effects were experienced until the height of 16,660 feet above the sea had been reached; but at that altitude (and at the pressure of 16.500 inches) both he and the two mountaineers he had brought from Europe were rendered incapable (or, to use his own expression, were placed *hors de combat*) through their inability to imbibe a sufficiency of air. In course of time both he and his assistants accommodated themselves to the conditions: 1, By breathing deeper; 2, by more frequent respirations; and 3, by eating less; and after passing a month at great elevations they were so far righted that they were unable to trace any effect due to diminution in atmospheric pressure, except that they were weaker (which was attributed to their having eaten much less than the amounts which they habitually consumed at low levels), and that at elevations of 16,000 feet and upwards they were unable to sustain active exertion except by breathing through open mouths.

In conclusion, Mr. Whymper referred to his ascent of Cotopaxi, "the loftiest of all volcanoes that are in working order," and showed views of its summit, etc., etc. The ascent was effected from the west, and an encampment was made on that side, about 100 feet below the most elevated point of the crater, at a height of 19,500 feet above the sea. The stay there of 26 hours, to study the crater by night and other matters, is probably the greatest length of time that any human beings have ever remained at so considerable an elevation.

GEOGRAPHICAL RECORD.

NORTH AMERICA.

THE TOPOGRAPHIC SURVEY OF NEW YORK STATE.—The United States Geological Survey has thus far published seventy-three of the atlas sheets, giving the results of the topographic survey of this State as far as it has progressed. The sheets cover nearly all of the eastern tier of counties, but only the Brooklyn sheet of Long Island is yet ready. The survey has also been extended east and west across the State, through the Mohawk valley and to Niagara Falls, with a break in Wayne and Cayuga counties. The Ithaca, Elmira, and Olean sheets are all that are yet issued for the south central and south western parts of the State. The sheets now ready cover a little more than a third of the total area.

THE BOARD ON GEOGRAPHIC NAMES.—All the decisions of this Board on questions of geographic nomenclature, from the time of its organization in 1890 to the present, are included in the second edition of its second Report, just published. Nine years have elapsed since the publication of the first Report. The decisions since that time have appeared irregularly in pamphlet form. It will be a convenience to many writers who desire to profit by the decisions of the Board to have so much of its work in a single volume. Congress authorized the printing of 19,000 copies of the two editions of this report, which will probably supply the demand. The Report makes note of the action of Congress in overruling the decision of the Board that the Spanish Puerto Rico was the preferable spelling of the name of the island we had acquired. The time-honored English spelling, Porto Rico, is now appearing in all Government publications.

GEOLOGICAL SURVEY OF CUBA.—Dr. C. Willard Hayes and Messrs. T. W. Vaughan and A. C. Spencer, of the United States Geological Survey, have been detailed to make a study of the mineral resources of Cuba. Dr. Hayes and Mr. Vaughan have reached the island and begun work. The expense of this undertaking will be met by the Cuban government. A careful study of the mineral resources of Cuba will be of much economic value to the island.

SOUTH AMERICA.

THE TOCANTINS AND ARAGUAYA RIVERS TO BE OPENED TO COMMERCE.—*Le Mouvement Géographique* (1901, No. 11) says that a

Belgian company will undertake to make the large Tocantins and Araguaya rivers available for commerce. These large rivers flow northward from the uplands of the state of Goyaz, in inner Brazil, to the Atlantic. They have usually been classed in the Amazon basin, but in fact have an independent outlet to the sea through the estuary known as the Pará river. About 300 miles from the sea they unite, and just below their confluence rapids begin to interrupt navigation. This interruption continues for about 100 miles, between Praia de Rainha and Alcobaça, in which distance the united rivers drop about 700 feet. A Brazilian company received a concession twelve years ago to build a railroad around the rapids, but was unable to carry out its contract. A Belgian company has succeeded to the rights thus forfeited by the Brazilian concern. A committee sent from Belgium has reported that the estuary is navigable by large sea-going vessels from the ocean to Cameta, over 100 miles; that ordinary river vessels may ascend to Alcobaça, about 300 miles from the sea; that the railroad around the rapids, 100 miles in length, involves no special engineering difficulties, and that both rivers above the rapids may be navigated to Goyaz by river steamers after some improvements have been made, particularly in the Araguaya. The rivers flow through large tracts of forests, which alternate with still larger areas of pastoral lands. For hundreds of miles there are rubber resources which have scarcely yet been touched, because transportation has been difficult. Cattle are the chief animal resource. Large herds abound in Goyaz and along the Tocantins, where a steer is worth only \$10, though the average price is \$40 at Pará, where a hundred head of cattle are killed every day for the market. Engineers are about to leave Belgium to carry out surveys for the railroad, and another party, led by Mr. Leon Thierry, has sailed to make a study of the mineral wealth of the two valleys.

DIVERSIFYING CROPS IN BRITISH GUIANA.—The British Colonial Reports for 1898-99 say that the inhabitants of British Guiana, who have been chiefly engaged in the cultivation of sugar-cane, are beginning to direct their attention to rice, tobacco and other crops which may successfully be produced on the alluvial lands between the coastal area and the sand-dunes of the interior. There is export demand for these other crops, and it is highly desirable that British Guiana should cease to confine her attention to sugar-cane, which has been a precarious dependence in recent years, owing to the competition of beet sugar.

EUROPE.

THE SALT LAKE AT LARNACA.—The *Geographical Journal* (Feb., 1891) says that Mr. C. V. Bellamy has recently made an investigation of the salt lake at Larnaca, in Cyprus, to ascertain, if possible, the origin of the salt. The lake is about a mile southwest of the town of Larnaca, in a hollow on the east side of a basin whose lowest part is ten feet below mean sea-level. In a paper read before the Geological Society, Mr. Bellamy said the barrier between this lake and the sea is mainly composed of shelly sand, overlying a bed of stiff calcareous clay associated with conglomerate. The land between the lake and the sea is too salt to be cultivated, but on the other sides the soil is of average fertility. The sea-water appears to percolate through the sand, and being kept near the surface by the clay beneath, slowly reaches the basin, where it is evaporated by the summer heat and deposits its salt. Artificial channels have been made to intercept the flood-water of the lake's tributaries and convey it to the sea, so that it may not dilute the lake brine. The salt harvest begins in August, at the height of the summer heat. One heavy shower at this time suffices to ruin the salt prospects for the year. The quality of the salt is of unusual excellence.

HYDRAULIC POWER IN THE FRENCH ALPS.—According to the *Annales de Géographie* (Jan., 1901), the utilization of the water-power of France's Alpine region has become a question of much interest. The coal crisis (which led to advanced prices for that fuel last year), the activity in metallurgic and other industries, and the inadequacy for her needs of the home supply of coal in France, are turning attention to schemes for utilizing the water resources of the Alps. This mountain region in France has an area about equal to that of the Alpine districts of Switzerland, Lombardy, and Piedmont together, but is much less densely populated, and this is one of the reasons why Switzerland and Italy have surpassed France in utilizing the power of mountain streams. There are now fifty-eight factories, with 250,000 horse-power, in the French Alps. It is estimated that the minimum power at low water among these mountains which may be made effective is 3,000,000 horse-power. A committee of engineers, under the auspices of the Minister of Public Works, is now studying the project of M. Souleyre, who proposes to transmit, electrically, water-power from the lower Rhone for industrial and agricultural purposes.

ASIA.

SURVEYS IN THE PHILIPPINES.—It has been announced earlier that the Coast and Geodetic Survey is about to carry out a survey of the numerous harbors among the islands and make soundings in the coast waters to facilitate navigation. The navigable rivers will also be charted. The *National Geographic Magazine* says that civil service examinations are to be held in Manila for the selection of fifteen Filipinos to take part in this work. Young men who are selected will probably be brought to the United States for preliminary training in the office of the Survey at Washington before being assigned to field service.

NAGASAKI AS A FREE PORT.—The Chamber of Commerce at Nagasaki desires to give that port, which is surpassed in volume of business only by Yokohama among the ports of Japan, greater importance in the forwarding business. To this end they have petitioned their Government to establish a free port at Nagasaki similar to the free ports of Germany. In other words, they desire that a portion of the water-front be set apart as a place where goods may be landed without paying duties. These goods destined for other countries will be sent to Nagasaki for trans-shipment, and deposited in the free port till placed on board the vessels that take them to their destination. Nagasaki desires in this way to become an entrepôt for Korea and north China, a business that is now almost monopolized by Shanghai.

AFRICA.

A RAILROAD IN DAHOMEY.—*Le Mouvement Géographique* (1901, No. 13) says that the French Government has decided to build a railroad, about 400 miles in length, from the port of Kotonu, on the Gulf of Guinea, to the Niger river, just west of the boundary of Sokoto. The line will thus traverse Dahomey from south to north. A preliminary survey has been made of the route as far as Paraku, about 200 miles inland, and the work of constructing this part of the line has already begun at Kotonu. The region which this railroad will traverse has a comparatively dense population. It is expected that the road will have an important effect upon the development of the French Sudan and Sokoto. It will reach the Niger above the rapids at Busa, which impede navigation, and it is expected to place the interior of the French Sudan within twenty days of Bordeaux.

PETROLEUM IN ALGERIA.—The Governor-General of Algeria reports that there are four zones containing petroleum, extending

from northwest to southeast, in Western Algeria. The most southern zone is about 125 miles long. The petroleum indications resemble those at Baku and in Galicia, and seem to warrant large expectations. In Constantine, also, petroleum-bearing areas have been found which seem to be the continuation of the Oran zones. Several companies have applied for concessions to develop these oil resources. (*Deutsche Rundschau für Geog. u. Stat.*, Jan., 1901.)

CAVES IN EAST AFRICA.—Mr. P. Chaudoir, in *Le Mouvement Géographique*, describes some interesting limestone caves within a couple of hours' walk from the coast town of Tanga, in East Africa. One of them has a large opening in the wall of a cliff. A short distance inside are chambers, rising to a height of 100 and 250 feet, beyond which is a vast room covering an area of 5,000 square yards. He met the same difficulty in exploring these caves that is usually encountered in caves of tropical countries. The roofs and walls of the passageways are covered with bats. Many of them are very large, and one of them, killed with a stick, measured four feet ten inches from tip to tip of the wings. The explorer says he believes these caves are equal in extent to some of the most famous caverns of France.

THE SIWAH OASIS.—Last fall the *Zeitschrift* of the Berlin Geographical Society published an account of Lieut. von Grüner's visit to Siwah, west of Cairo, formerly consecrated to Jupiter Ammon, where the renowned oracle was once consulted by Alexander the Great. The German traveller was well received; even the Sheikh al Habun, the representative of the Mahdi of the Senussi, invited him to dinner, and the explorer departed of his own volition after a stay of a fortnight. He was not permitted, however, to make surveys, and he failed in his attempt to secure squeezes of the hieroglyphics in the Temple of Jupiter Ammon, but brought home numerous photographs of an ancient temple in Aghermi, which he was the first to visit. He ascertained that the temperature of the famous Fountain of the Sun is uniformly 88° F. at all hours of the day and night.

Professor G. Steindorff, in a later visit to Siwah, was more successful. He has a paper on his journey and explorations in the *Zeitschrift* (Dec., 1900). His party started from Cairo on Nov. 30, 1899, in the direction of Wady Natron, where many convents of Macarius and other saints were visited. Thence the party marched west for nineteen days, when they reached the Siwah oasis. The

exploration of the ruins of numerous temples brought rich results, and in the cemeteries of Zetun and Abul Anwaf many glass mosaics were found. The party started to return on January 8. In the Bahrieh oasis, where they remained seven days, two Egyptian temples, dating from the sixth century B.C., were discovered; and near El-Kasr-Bauiti two tombs of princes of the fourteenth century B.C. were found.

THE UGANDA PROTECTORATE.—Sir Harry Johnston, special Commissioner of the Uganda Protectorate, has issued a report on that important part of British East Africa. His report is accompanied by maps showing the climatic and other influences that will affect the future of the country. He divides Uganda into zones of altitude, as, in his opinion, the healthfulness of each district is mainly determined by elevation above the sea. On one map he shows large areas that are over 5,000 feet above sea-level, and almost entirely free from malarial fever. He considers the districts as healthful for the white race as the best parts of North and South Africa. The country between 5,500 and 3,500 feet is only moderately healthful, and the regions under 3,500 feet are not adapted to become the home of white men. This is the case along the banks of the Nile, the coasts of Lake Albert, and, in a lesser degree, on the shores of Victoria Nyanza. A rainfall map shows that a wide region north, east, and west of Victoria Nyanza has from forty to sixty inches of rain a year. The rainfall decreases to the north and northeast, and is probably less than ten inches a year on the southern half of Lake Rudolf. The most densely-peopled areas are along the western and northern shores of Victoria Nyanza and around Mount Elgon, northeast of the lake, where the density is from 60 to 100 to the square mile. The Waganda and other representatives of the Bantu races of Africa in Uganda have made great progress through the efforts of missionaries, but the negro tribes of the upper Nile, on the contrary, give little encouragement to missionary effort. About two-thirds of the country is extremely fertile. The abundance of the banana, which is the mainstay of the natives, encourages idleness among them, because they can procure all the food they need without effort. Wheat, barley and oats thrive in the higher regions, and almost every other cereal in the lowlands. The swampy valleys are admirably suited for the cultivation of rice, and there is no reason why Uganda should not become one of the great coffee-growing countries.

NOTES ON COMMERCIAL GEOGRAPHY.

One of the leading French trade papers says that the consumption of raw silk in the United States has for three years exceeded that of France. The manufacturing development of this country, which has equalled that of France since 1897, now surpasses it. Consul Brunot has written to the State Department that leading silk men of Lyons and St. Etienne say the day is coming when American manufacturers will sell silk piece goods and ribbons in Paris and London. Our silk industry has reached a large development only within the past few years. The home silk mills now produce the larger part of the silks this country consumes. At present, however, the silk trade is laboring under the disadvantage of over-production.

A company, chartered under the laws of South Carolina, is planting tea on 6,000 acres of land, purchased near Charleston. Tea requires rich soil for the best results, and, as little of the land on the proposed tea farm is in the best condition, only a small acreage will be planted this year. All the land will be enriched, and next year 5,000 acres will be planted. It is known that the tea plant will thrive in several Southern States, but the business has never been placed on a paying basis. The result of the present experiment will be watched with interest.

Bulletin 58 of the Census Bureau, devoted to cotton-ginning, is the first report of its kind made by a United States Census. The report shows the important changes that have occurred in the areas of cotton production. The high price of cotton after the Civil War led to its cultivation to some extent in California, Illinois, Indiana, Nevada, Utah, and West Virginia. With the advent of low prices cotton culture gradually disappeared from those sections not peculiarly adapted for it. The loss in the States lying along the northern border of the cotton belt is, however, more than offset by the increased production in the territory west and southwest of the Mississippi river. This increase is practically confined to Texas, the Indian Territory, and Oklahoma. In 1899 Texas produced 28 per cent. of the entire cotton crop, heading the list of cotton-producing States. The territory west of the Mississippi in 1899 produced 45 per cent. of the whole crop.

A report on the manufacture of beet sugar just published by the Census Bureau says that the beet is now yielding more than a third of our domestic sugar product. Thirty-five factories have been

built since 1896, and the thirty-one factories now in operation include nine in Michigan, eight in California, and fourteen in other States and Territories from Washington in the north to Mexico in the south and New York in the east. Most of the factories are large, substantial buildings, designed with the view to accommodate so much machinery that their present output may at least be doubled in the future. In view of these facts the industry in this country is now regarded as a commercial success.

The *Financial Times* of London says that our calico is now competing successfully with English prints in the British market. Calicoses made in this country are selling in England, and are considered to be excellent goods of their kind. This is an innovation in our cotton trade. The sheetings, prints, and other cotton fabrics made in this country are for the most part classed among the coarser products. We have not attempted on a large scale to make fine cotton goods. There is little demand for them at home, and the cost of making and finishing them in our mills is much larger than in England on account of the skilled labor required, for which we pay higher wages than British operatives obtain. So it happens that the cottons we have made for home consumption or export have in the main been common cloths.

The German Antarctic Expedition, which will start for Kerguelen Island in a few months, will give special attention to the study of sea life and its economic aspects. None of the useful varieties of fish is yet known to exist in Antarctic waters. The southern boundary of the fishing regions now lies along the sailing routes between Cape Town, St. Paul Island, Tasmania, New Zealand, and Magellan Strait. It is thought, however, that useful fish may exist in Antarctic waters, and the German expedition will investigate this possibility.

The Royal Mail Steamship Company has contracted to place in each of its steamers plying between Europe and the Rio de La Plata a chilling apparatus, with a capacity of 1,500 beef carcasses. Three thousand carcasses will be shipped to Southampton each month by a single Montevideo company. The average voyage from the La Plata requires about 22 days. Other meat companies are making similar arrangements, and, according to Consul Swalm of Montevideo, the Rio da La Plata countries will in the future be a stronger competitor with the United States in the English and other European markets.

POLAR REGIONS.

THE BALDWIN-ZIEGLER EXPEDITION.—It is announced that this expedition to the North Pole will start in June or July.

There will be two ships—the *America* (a steam-whaler, built two years ago) and the *Fridtjof*.

The *America* has three masts, and is barkentine-rigged. Her engines have been placed aft, so that the vessel will be able to climb the ice and tread it down. Her bows are iron-sheathed, well fitting her for cleaving her way through ice. Her screw is in a lifting well. The *Fridtjof* will accompany the *America* as a provision and equipment ship. She will accommodate a party of scientists and sportsmen, and will leave Tromsö, Norway, on June 25, to return on September 1. She is fitted up with laboratories, cabin accommodations, dark rooms, etc.

Arrangements have been made for sledges and for the dogs. The headquarters will be in Franz Josef Land, and the route followed will be substantially the one taken by the Duke of the Abruzzi. Mr. Baldwin expects to be gone for a year, and his party will live in this manner:

There will be no sleeping out of doors. Plenty of tents will be taken, some of canvas, others of raw silk. Then there will be warm meals, as frequently as possible. Oil will be used as fuel. For warmth we shall have to depend on our clothes by day and sleeping-bags by night. The food for forward work will be condensed, but for life at headquarters and on ship I believe in ordinary food. No spirituous liquors will be allowed in forward work.

CAPT. J. E. BERNIER addressed the Canadian House of Commons on the 18th of March on the subject of his expedition to the North Pole by way of Bering Strait. He estimates that his expedition will cost about \$130,000, including fair compensation, not only for the crew of his ship, but also for the members of his scientific staff. The vessel he is to build will be of 300 tons burden and modelled after the *Fram*, but with improvements suggested by Nansen's experience.

Lord Minto, the Governor-General, has become the patron of the enterprise, and it is hoped that the Dominion Parliament will give financial help. A subscription list has received numerous signatures.

THE ARRANGEMENTS for the British Antarctic Expedition are completed.

The *Discovery*, which has been built like a whaler, with greatly-increased strength to withstand the ice, was launched on the 21st

of March at Dundee. Her equipment and stores will be taken on board in London.

The ship is 171 feet in length, with 34½ feet beam, and 1,500 tons displacement.

The expedition will leave London in July or August for Melbourne, under the command of Lieut. R. F. Scott, R.N.

THE SHIP built for the German Antarctic Expedition was launched at Kiel on the 1st of April. It has been named the *Gauss*, in honour of the great mathematician.

A LITTLE-KNOWN COLONY.

BY

W. L. AVERY.

Fifty years ago the names of British Honduras and Belize were as frequently uttered in the Senate of the United States as those of Nicaragua and Costa Rica are now, for in the discussion of the Clayton-Bulwer Treaty the question of the rights and status of the tiny Government had to be defined and settled. Great Britain and the United States had agreed not to "assume or exercise any dominion over . . . any part of Central America," but their understanding was that the engagements of the convention did not apply to Her Majesty's settlement at Honduras. The name Central America was applied collectively to the several Republics there organized, and the little colony was allowed to pursue its quiet way, forgotten by the greater part of the world.

The early history of the country is the legend of the buccaneers, and to one of the most celebrated or notorious, a Scotchman of the name of Wallace, the capital owes its name. The Spanish pronunciation *Vallis* was easily corrupted to *Ballis*, and this again to *Balize* or *Belize*. The attempt to trace the derivation to the French *balise*, a beacon, or rather a buoy, cannot well be sustained, for there is no record of any beacon—and, in fact, that is exactly what a buccaneer would *not* erect, his chief aim being to secure a hidden refuge when pursued by the Coast-guard. The designation of British Honduras was not assumed until the appointment of a Lieut.-Governor in 1862, and it is regretted by the native races even now that the name *Belize* was ever changed, the colony being now frequently confounded with the Republic of Honduras. The first record of any British inhabitants in this or any part of Central America dates back to 1638, when a vessel was wrecked on the coast, and the nucleus of the settlement was formed; and in 1671 the Governor of Jamaica reports an increase of customs and commerce with Belize "more than any of His Majesty's colonies."

The industry of these early pioneers was directed to the same channels that engage the labor of their descendants—the cutting and exporting of logwood, cedar, and mahogany; and as all these woods then brought more than ten times the market price of later years, and the value of money was far greater, the colony rose in wealth and importance, and the dignity of its local government was enhanced. The administration was by Magistrates prior to 1786,

then by Superintendents appointed by the Crown, until, in 1862, it was ruled by a Lieut.-Governor, subordinate to the Governor of Jamaica. In 1884 it was created a Crown colony.

It must be remembered that until 1798 the people were really Britons and their slaves, settled in what was admittedly Spanish territory, and not at all with the consent of Spain, nor yet with even an acquiescence on the part of the native tribes of Indians, their neighbors in Yucatan. Frequently, during the eighteenth century, the colonists had to fight for their lives; but they prospered and gained in numbers and in strength, and had an apparently firm footing in their tropical home.

It is difficult on any principle of law to justify these early adventurers in forcing a settlement in what was Spanish territory, both by discovery and conquest, and the English Government, it must be said, afforded little aid or encouragement. In 1763 the Government of Spain recognised by treaty the right of British subjects to "cut, load, and carry away," unmolested, the woods of the country, but reserving to Spain the sovereignty of the soil.

It is more than likely that this concession was granted grudgingly, for the settlers were continually annoyed by official and unofficial interference and effort to control, continued for a number of years, until, in 1798, came the ultimatum and the battle of St. George's Cay, and from September 10 of that year the colony was free from Spain, and passed wholly under the jurisdiction of Great Britain. It is impossible to understand or explain the lack of progress in the colony; but if the old Baymen who helped to win that victory in 1798 were to visit the scenes of their prowess now, a century later, about all the changes they would notice would be the new source of light, petroleum, and the vessels moving with no aid from the winds—the steamers in the harbor. All else is unchanged. Yet British Honduras is a beautiful country, rich in woods and in fruits, with a soil the most fertile and a climate with which it would be hard to be discontented; and from the similarity of its geology to that of the surrounding Republics, it is certain that it contains much mineral wealth.

Those who wish for a few quiet weeks in the tropics could find no more restful, hardly a healthier resort. There are pleasant excursions for those who are fond of sailing or of riding, but there are no wagon roads in the colony. There is frequent communication *via* Mobile and New Orleans with the United States, and by the Harrison Line to Liverpool with Europe, and as these last-named steamers touch at Vera Cruz, in Mexico, the return trip to the United States may be made through that wonderful Republic.

M. FROIDEVAUX'S PARIS LETTER.

PARIS, March 15, 1901.

My last letter contained a brief historical note of the Société de Géographie, from the time of its foundation in 1821 to the year 1900. I have now to speak of its organization, its publications, and the part which it has borne in popularizing geographical science in France.

Any one, of whatever nationality, may become a member by the payment of annual dues of 36 francs (and cost of diploma, 25 francs, single payment) after his name has been presented by two members and accepted by the Central Commission.

Women are eligible as well as men, and enjoy the same rights; that is to say, they receive free of cost *La Géographie*, the bulletin of the Société, and if they live in Paris, cards of invitation to the public meetings of the Société. Any member may purchase exemption from annual dues by the payment, once for all, of 400 francs, not including cost of diploma.

The Bureau of the Société is composed of a president, two vice-presidents, a secretary and two controllers. The Bureau is renewed every year, by election, every member having the right to vote. The Bureau includes, in addition, a treasurer and a librarian, who are elected for five years, in the same manner. Besides the Bureau there is the Central Commission or Council of the Société, charged with the whole administration and acting in the name of the Société. It is composed of thirty-six members, including the treasurer and the librarian, and is directed by a president, two vice-presidents and a secretary-general, with whom may be associated other secretaries. This Central Commission is divided into three sections: for correspondence, for publication, and for accounts (this last composed of six members). The section for correspondence (twelve members) maintains relations with the learned societies, the travellers and the geographers of other countries, while the section for publication (twelve members) is charged with everything that concerns the printing of previously unpublished books, narratives of travel, and the engraving of maps. This section decides all questions relating to the publication of *La Géographie*.

Such is the organization of the Société de Géographie, which numbers at present more than 2,000 members, and possesses its own establishment in the very centre of resources for study, not

far from the Sorbonne, the Collège de France, and most of the great Parisian libraries and the principal collections of archives. The library, which increases every day, thanks to gifts and to numerous exchanges, now contains more than 45,000 volumes, bound and unbound, more than 5,000 maps, 11,000 series of photographic views, more than 6,000 blocks for printing, and about 3,000 portraits of travellers and geographers. This library, which is opened on certain conditions to non-members, renders great services to students, and especial service to the members of the Société, who not only pursue their study in the building, but have the exclusive privilege of borrowing volumes. In the absence of a settled plan it has been found impossible to form a museum for collections made by travellers. It may, perhaps, be possible to add this *desideratum* at a later day.

From the month of June, 1822, to that of December, 1899, the organ of the Société was the *Bulletin*, the complete collection representing 134 octavo volumes, in seven series, of which the first four are provided with general analytical tables. There must be added to this collection the 18 volumes of the *Compte Rendu des Séances* for the years 1882-1899. Other publications made by the Société or under its auspices are: a *Recueil de Voyages et de Mémoires* in seven large quarto volumes; a *Guide Hygiénique et Médical des Voyageurs dans l'Afrique Intertropicale* (published in association with the Société de Médecine Pratique de Paris); an atlas of the *Fleuves de l'Amérique du Sud* from the surveys of the regretted Dr. Jules Crevaux; and the *Journal d'un Voyage en Arabie* performed in 1883 and 1884 by the unfortunate Charles Huber, published with the assistance of the Ministry of Public Instruction. To these must be joined the precious collection of *Rapports Annuels sur les Progrès de la Géographie* prepared for 25 years (1867-1892) by the honorary Secretary-General, M. Charles Maunoir, and a Map of Africa on a scale of 1:10,000,000; now in its fourth edition.

These were the publications of the Société de Géographie up to last year, since when its *Bulletin* has been replaced by *La Géographie*, at the head of which are the Secretary-General and M. Charles Rabot, the well-known explorer of the Arctic Regions. The latter gives all his care to this review, which is published monthly by Masson, in large octavo form, with maps and illustrations. I have frequently had occasion to mention articles in *La Géographie*, which is edited by a special committee, presided over by Prince Roland Bonaparte.

The Société de Géographie intends soon to publish a complete

account of the journey of M. Fernand Foureau from Algeria to the Congo by the Sahara and Lake Tchad, with the scientific results obtained; and also an atlas of surveys made in Central Asia by M. Marcel Monnier.

It is not only by these different publications that the Société aids in the progress and spread of geographical science; it also makes appropriations in aid of explorations, it awards prizes, and it provides a series of lectures regularly twice a month from the beginning of November to the end of June. The greater part of these lectures take place at the meetings, so called, of the Central Commission; others in the two annual public meetings, presided over by the Bureau of the Société; others again at the meetings called *solennelles*, which are held sometimes at the Sorbonne, sometimes at the Trocadéro. These meetings are reserved to eminent travellers whose explorations have aided in the development of the French influence and in the progress of geographical science, and the one last held was devoted to the reception of the Foureau-Lamy Mission. This same mission is the last one which the Société has aided with funds; thanks to the legacy of Renoust des Orgeries, the Société was able to pay the larger part of the cost of this important journey.

Measures are now being taken to reconstitute a Travellers' Fund, the interest of which is to be applied to the help of distant expeditions and the publication of the discoveries made; and though it is now but small in amount, this capital must, in time, suffice to meet the expenses of new scientific expeditions.

Already, for many years past, the Société has been able to offer rewards, in a certain degree, to the most distinguished travellers and scholars. Not content with encouraging geographical studies in establishments of secondary instruction and others, the Société awards every year nearly 25 prizes, or medals, many of which are furnished by special foundations. Of these prizes the one most coveted is the Great Gold Medal of the Société, reserved for the traveller who, in the course of recent years, shall have accomplished a journey of exceptional importance and value for its results; those on whom this medal is bestowed receive, if they are French, the title of Life Members, and that of Corresponding Members if they are foreigners.

Besides these prizes the Société proposes to award, in 1902, new recompenses to the winners in the competitions instituted in 1900, the purpose of which is to extend the geographical knowledge of France and its colonies. Admission to these competitions is reserved

to Frenchmen, and the text of the three subjects proposed will be found in *La Géographie* for July, 1900 (pp. 75-77).

The Société is also interested in the history of geography, as is proved by the existence of its Jomard prize, and also by the care with which it celebrates the centenary of the great explorers; the geographical work of Cook, of La Pérouse, of d'Entrecasteaux, of Mendaña, of Barentz, and of Vasco da Gama has been commemorated in special sessions of the Société.

Furthermore, the Société has been able, through the Poirier legacy in 1883, to distribute a yearly revenue to French travellers in recognition of journeys exceptionally useful to science and commerce.

Such is, briefly stated, the present organization of the Société de Géographie; and the regularity in the working of this association, which receives no appropriation from the State, does the greatest honor to Baron E. Hulot, its Secretary-General since 1897.

The latest news received of French travellers is of new geographical problems, either stated or solved by French savants and explorers.* In France, M. Bleicher, taking up a question which seemed to have been settled by Mr. W. M. Davis, contends that the Moselle never was an affluent of the Meuse, and denies that the Meurthe captured the Moselle to the detriment of the neighbouring river; in his view the floor of the Val de l'Ane is not a residue of the ancient alluvium of the Moselle mingled with the débris of landslips.† This brings up again a problem which appeared to be definitely settled.‡

In Africa many officers are at work upon surveys. Lieut. F. Dromard has made reconnoissances on the Ivory Coast, which unite the itineraries of the two missions, Woelfel-Mangin and Hostain-D'Ollone; and Dr. Cureau, in concert with a German party, is engaged in defining the limits of the French Congo and the Kame-

* Thus, M. de Martonne, in the *Annales de Géographie* of January 15, has studied the mode of formation of the cirques, and, after giving a definition of the cirque and carefully differentiating it from similar forms (crater, torrential receiving-basin, etc.), has explained why he finds the determining cause of its formation in the glacial action. He closes his study by formulating geographical and geological conclusions, and this

general law in the chiselling of the high mountains; outside of the tectonic action and the contact of rocks of unequal hardness, every break in a slope is the mark of a line which formed during a long time the limit of two regions, in which agencies of different nature were engaged in the destruction of the relief.

† And nothing now proves the ancient passage of the Moselle through the Val de l'Ane to join the Meuse.

‡ Attention is called to M. Henri Tavernier's most interesting paper, *Etude Hydrologique sur le Bassin de la Saône*, in the *Annales de Géographie*.

run, in accordance with the treaty. *La Géographie* has also just published the results of the Mission Gendron. It was in June, 1899, that Commandant Gendron undertook to unite, by a chain of triangles and by a line of certain geographical positions, astronomically fixed, the two chief places of the French Congo, Libreville and Brazzaville. If the events on the Shari did not permit the completion of this programme, one of the party, Lieut. Jobit, was none the less able to carry out all his instructions from Libreville as far as the Alima, and an itinerary based upon ten astronomical positions was laid down with the compass. Another officer, Lieut. Loefler, has studied the region of the N'Gonnié and the Alima, and the Upper N'Gonnié and the Nyanga. An excellent map by M. V. Huot illustrates and explains these notes.

The return of M. E. Gentil's expedition to the Shari-Sangha brings the solution of the long-disputed question of the Wâm. M. Clozel, in 1895, made this river an affluent of the Shari; the Belgian geographer, M. Wauters, regarded it as the upper course of the Mpoko. It appears, from a map published in February in the *Bulletin du Comité de l'Afrique Française*, and from Dr. Huot's article in *La Géographie* for March, that the Wâm of Clozel and Perdrizet is none other than the mother-branch of the Bahr-Sara, an affluent of the Shari on the left, and in reality the Wa-Bahr-Sara and the Wâm of Perdrizet and Clozel are one and the same river. The explorer, E. Gentil, returned to Paris at the end of February, and later we shall be able to report more fully on his labours.* We shall have reports of the same kind also from Commandant Destanave, who is at the head of an expedition to the Shari.

The geographical and geodetic study of Madagascar is patiently continued. The year 1900 was fruitful in results. Father Colin, who has already done so much, hopes to determine precisely the still unsettled positions of Menajary, Farafangana, and Cape Sainte-Marie. The programme for 1901 embraces a longitudinal chain parallel to the central chain, from Majunga to Cape Sainte-Marie, and united to the coast by transverse chains; and by the end of the year 1901 the general topographical knowledge of the island will be complete. We may mention also the account published by the *Revue de Madagascar* of M. E. J. Bastard's second journey in the island, in the course of which he laid down in the Mahafaly country, to the south of the Onilahy, 500 kilometres of new itiner-

* The same may be said with regard to Capt. Joalland, who brings back new surveys of positions on the shore of Lake Tchad and other scientific documents.

aries, in a region till then obstinately closed to the Europeans, and thus prepared the occupation of the country by the French troops.

I have already noticed the journey accomplished in 1898-1900 by M. Charles Eudes Bonin from Peking to Russian Turkistan by Mongolia, Koko-Nor, Lob-Nor, and Dzungaria. The account in *La Géographie* shows that the explorer followed a route, for the most part unknown, from Ning-Hsia to Liangchou, that he crossed the Nan-Shan by a new road and completed the orography of the country for a great distance, and that he is the first who has crossed the Tian-Shan directly from the south to the north between Kara-Shar and Umrumtchi. It is to be hoped that he will give a detailed account of his travels.

These are the principal facts in exploration since my last communication. We may note also that the lectures on Madagascar, organized at the Museum, met with very great success, and that there has just been founded in Paris a Comité de l'Asie Française, which aspires to play a part analogous to that so well performed by the Comité de l'Afrique Française.

There is always a lull in the publication of new books immediately after the holiday season, and we have still to wait for the reports of the various Geographical Congresses held in 1900. In the Compte Rendu of the session of the Institut Colonial International, held in Paris in August of last year, will be found a valuable report on Colonial Sanatoria, by Dr. G. Dryepondt.

M. Charles Lenthéric, well known by his studies of the French Mediterranean coast, has just brought out a volume on the *Côtes et Ports Français de l'Ouan* (Wan-hsien). There are good chapters in this book, to which the author might well have given a greater development.

The same remark applies to the *Statistique Générale de l'Algérie, pour les années 1897, 1898 et 1899*, filled as it is with most valuable and interesting details; it omits the roads and the manufactures of the colony, as well as the returns of commerce and navigation for 1899.

With this may be mentioned an excellent study of the European Population of Algeria by MM. G. Mandeville and N. Demontès, published in the *Questions Diplomatiques et Coloniales*, of August 15, and illustrated by nine maps. M. Gaston Dujarric presents, in *L'Etat Mahdiste du Soudan*, the detailed story of the singular and ephemeral state formed in the Sudan by the Mahdi and organized in 1885 by his successor, the Caliph Abdallah.

Two works on Asia must be noted: *Les Puissances Etrangères*

dans le Levant, by MM. Verney and Dambmann, and *La France du Levant*, by M. Etienne Lamy. In his work, *En Chine*, devoted to the south-eastern portion of the province of Chi-li, Father H. J. Leroy has brought together a mass of ethnographical information. The *Itinéraires dans l'Ouest de la Chine* are purely geographical; they show the route followed by M. Claudius Madrolle from Mongtsé to Yunnan-hsien, the Blue River, Tibet, and finally to Chingtu-fu, in 1895, together with a general map of Yunnan, giving the posts of the Chinese troops in the province, and a plan of Yunnan-hsien.

Nothing has been published on Oceania or on America; but a book which has its value for history, as well as for science and for historical geography, is not to be overlooked. This is the *Lettres Écrites d'Egypte*, by Etienne Geoffroy Saint-Hilaire, to Cuvier, Jussieu, Lacépède, Monge, Desgenettes and others, and to his family. In these letters, edited by Dr. E. T. Hamy, Geoffroy relates his impressions, and recounts the principal events of the expedition under Bonaparte, together with the meetings of the Egyptian Institute and the summary of his own scientific work.

HENRI FROIDEVAUX.

NOTES AND NEWS.

THE PEARY ARCTIC CLUB sent by express, on the 29th of March, to Dundee, in Scotland, the second annual mail to R. E. Peary. There are five copies of this mail, and one copy will be put on board of each Dundee whaler, to be delivered to the Eskimos at Cape York and forwarded to Mr. Peary's headquarters in Greenland.

The letters contain the news of the death of Mr. Peary's mother; of the Duke of the Abruzzi's highest north; of the Baldwin-Ziegler Arctic Expedition and the British Antarctic Expedition; and of the departure of the *Windward* from Disco last August, with Mrs. Peary and her daughter on board.

A CORRESPONDENT WRITES:

Our school geographies for many years instructed children to pronounce the name Popocatepetl, the Mexican volcano, with "cat" accented and as though the last syllable were spelled "pel." F. P. Hoeck & Co. of the City of Mexico have written to the Board on Geographic Names that the name consists of two words. The first word, *Popoca*, is accented on the second syllable. The second word, *tepell*, is accented on the first syllable and is pronounced as though it were spelled "Taypel." A.

It is more easy to write about names than to settle their pronunciation. Mexican scholars seem to be the authority with regard to the native words, and the statements of Alonso de Molina in the ninth chapter of his *Arte de la Lengua Mexicana y Castellana, Segunda Parte*, do not sustain the accentuations quoted by our correspondent. Molina says that the natives of Mexico do not lay stress upon one syllable more than upon another in their speech and conversation.* He notes some exceptions in the use of verbs, and adds that sometimes the final syllable is accented in vocatives.

There are thirty-five lines in the chapter, including two *Avisos*, and three lines at the end of the *Aviso Primero* give a rule which any one may apply:

it is proper to know that, when you are unacquainted with the accentuation of any word of this language, you must pronounce equally all the syllables of the word, as in *nitetlaçotla*, pronouncing these five syllables with equality of voice and tone and measure.†

Popocatepetl may well come under this rule. Pimentel says, in the

* Es de saber que comunmente, o por la mayor parte, estos naturales no alcanzan una sillaba que otra en su hablar y platicas:

† Conviene a saber, que quando ygnorares el accento de algun vocablo desta lengua, pronuncies ygualmente todas las sillabas de la diction, assi como *nitetlaçotla*, pronunciando con ygual boz, tono y medida estas cinco sillabas.

Cuadro Descriptivo y Comparativo de las Lenguas Indígenas de México (Tomo 1º, p. 166):

There are no words with an accented termination except some vocatives, and almost all (words) have the penultimate syllable long.*

It is certain, in any case, that there is no silent letter in *tepetl*. Pimentel says:

the *ll* in the middle of a word sounds as in Castilian; but at the end it is pronounced *ll*, the *e* semi-mute, that is to say, without fully pronouncing it.†

Those who do not propose to speak Nahuatl may safely follow their chosen dictionary in pronouncing the name Popocatepetl.

MAZAMAS.—The Eighth Annual Outing of this mountain Club will take place in July, at Mount Hood. The circular notice says:

Headquarters will be established at timber-line, on the south side, from July 14th to 19th inclusive. On Sunday the 14th religious services will be conducted, but there will be no restraint on those who prefer to seek enjoyment elsewhere. The four following days will be devoted to scientific field work and exploration. On Friday, the 19th, the mountain will be ascended and appropriate exercises held on the summit, where the club was organized July 19th, 1894.

A select party of scientists will leave camp Saturday morning for John Day Valley, for exploration among the fossil deposits of that region.

No one attending the outing is under any obligation whatever, either to join the club or ascend the mountain, but we would be glad to welcome to membership all who have "Climbed to the summit of a perpetual snow peak, on the sides of which there is at least one living glacier, and to the top of which a person cannot ride, horseback or otherwise."

For further information address MAZAMAS, PORTLAND, OREGON.

MR. EDWARD WHYMPER, the British Alpinist, intends to spend the coming summer with Swiss guides among the Rocky Mountains of Canada. He will endeavor to ascend a number of peaks that have not yet been climbed, and he has particularly in view Mount Assiniboine, a fine peak about twenty miles south of the Canadian Pacific Railroad. It is nearly 12,000 feet high, bears a remarkable resemblance to the Matterhorn and is apparently inaccessible on all sides. Several attempts to ascend this mountain have failed. Professor Charles E. Fay, of the Appalachian Mountain Club, says that in this region, within twenty-five miles of the Canadian Pacific Railroad, there are at least a dozen peaks whose ascent is likely to be extremely difficult. He speaks of Mount Assiniboine as offering a problem apparently more difficult of solution than was the Matterhorn before Edward Whymper discovered its secret in 1865.

* No hay palabras de terminación aguda si no son algunos vocativos, y casi todas tienen la penúltima sílaba larga.

† la *ll* en medio de diccion suena como en castellano; pero al fin se pronuncia *ll*, la *e* semimuda, es decir, sin llegarla á pronunciar bien: (*op. cit.*, T. 1, p. 165.)

THE CENSUS OF INDIA.—The London *Lancet* prints the following table of the population of India, according to the census taken on the 1st of March:

BRITISH INDIA.	
Ajmere-Merwara.....	476,330
Assam.....	6,122,201
Bengal.....	74,713,020
Berar.....	2,752,418
Bombay.....	18,584,496
Burma.....	9,221,161
Central Provinces.....	9,845,318
Coorg.....	180,461
Madras.....	38,208,609
Northwest Provinces and Oudh.....	47,696,324
Punjab.....	22,449,384
Baluchistan.....	810,811
Andamans.....	24,499
Total British India.....	231,085,132
NATIVE STATES.	
Haidarabad.....	11,174,807
Baroda.....	1,950,927
Mysore.....	5,538,482
Kashmir.....	2,906,173
Rajputana.....	9,841,032
Central India.....	8,501,883
Bombay States.....	6,891,691
Madras States.....	4,190,322
Central Provinces States.....	1,983,496
Bengal States.....	3,735,714
Northwest Provinces States.....	799,675
Punjab States.....	4,438,816
Burma States.....	1,228,460
Total, Native States.....	63,181,569
Total, all India.....	294,266,701

In 1891 the total for all India was 287,317,048. The population of the Native States has lost in the ten years as much as 4.34 per cent.; that of British India shows an increase of 4.44 per cent. It is estimated that the States which suffered so severely from the famine—Rajputana, Central India and the Bombay States—lost not less than 5,000,000 of their inhabitants.

THE U. S. CENSUS OFFICE has received through the Department of State a consular report on the population of Germany and its changes since 1789, when it numbered 26,000,000. In 1815 it had increased to 30,000,000; in 1845, to 34,000,000; in 1865, to 40,000,000; in 1885, to 47,000,000, and in 1900 to nearly 56,000,000.

There are now in the empire thirty-three cities with more than

100,000 inhabitants. Berlin has 1,884,346; Hamburg, 704,669; Munich, 498,503; Leipzig, 455,120; Breslau, 422,415; Dresden, 395,349; Cologne, 370,685; Frankfort-on-the-Main, 287,813; Nuremberg, 260,743; Bremen, 160,823, and Strassburg, 150,268.

MESSRS. FREDERIK MULLER & Co., of Amsterdam, have sent a most beautiful illustrated catalogue of Manuscripts and Books, to be sold by auction on the 9-11 of May.

In the second part of this catalogue, No. 1421 describes a West Indische Paskaert by Blaeuw, of the year 1639, the prototype, according to Messrs. Muller & Co., of the charts printed in the Low Countries in the Seventeenth Century for the use of navigators in the service of the Dutch West India Company.

The chart of the year 1621, published in Dr. O'Callaghan's *Documents Relative to the Colonial History of the State of New York*, Vol. I., is declared by Messrs. Muller & Co., in their notice of No. 1421, to be a *mystification*, at least so far as the date is concerned. They say :

The original of O'Callaghan's map, now on exhibition in the Lenox Library, is a map published by Anthoni Jacobsz, without date. O'Callaghan has reproduced only the northern part of it and has put into the reproduction a vignette foreign to the map, and the fictitious date of 1621. This is the date of the foundation of the Company, but not at all the date of the map, for on the part of it not reproduced by O'Callaghan is recorded a discovery made in 1643 by Brouwer on the coast of Chili—a discovery made public in Holland in 1646. This is shown by the name Brouwershaven on the coast of Chili in O'Callaghan's complete original map, now to be seen in the Lenox Library.

The map reproduced by O'Callaghan and dated by him in the year 1621 is of a later date, and we assign it to about 1650.

In their description of the Paskaert of Anthoni Jacobsz (No. 1423) in the Catalogue Messrs. Muller & Co. add this remark :

The vignette introduced into his reproduction by O'Callaghan is a cartouche belonging to the Dutch maps published towards 1680. Who introduced this cartouche and the date of 1621?

A question not to be answered at this late day. Dr. O'Callaghan died in the year 1880.

THE PLACE of the *Korean Repository* was taken on the 1st of January by the *Korea Review*, which will be devoted to the record of events and the discussion of all subjects relating to Korea, outside of the political arena.

The population of Korea is given in the News Calendar from the official report of the recent census, by provinces. The total (including Seoul, with 196,898 inhabitants) is 5,608,351; but the editor is disposed to think that the actual population is greater, and that

the enumeration represents only those who pay taxes to the Government.

The mediæval city of Song-do is undergoing repairs, and preliminary surveys for the northern railroad have been completed to that point.

An article on the New Century presents an interesting picture of progress and improvement in the capital and the ports of the Kingdom, though it opens with a sentence that takes away the breath of those who are not fortunate enough to live in the Land of the Morning Calm:

As the World swings across the line that divides the Nineteenth Century from the Twentieth it finds all the civilized nations of the earth joined in a federation of amity and concord.

The editor begins in this number a history of Korea, based upon native books and manuscripts.

It does not appear how often the *Korea Review* is published, whether monthly, bi-monthly or quarterly, for the annual subscription of two dollars.

THE *Athenæum*, of April 20, has a note on Capt. Lemaire's first report on his mission to Katanga.

He found that not a single place of importance in the southern and eastern part of the Congo State had been correctly located. In the Congo-Zambezi region one important point was a degree out of its place, and well-known falls, lakes and camps along a line of 500 miles were 20 miles and more from their position on the map. The west coast of Tanganyika is brought further west, and the mouth of the Lukuga as much as 32 miles. The Lualaba branch of the Upper Congo is brought $37\frac{1}{2}$ miles nearer to the great lake.

Latitude and longitude are important; but the Congo Free State, in its short life of sixteen years, has had more than enough to do.

PROF. WM. H. BREWER, of Yale University, is reported to have said in a lecture that Lieut. Eld, U. S. N., of New Haven, Conn., was the discoverer of the Antarctic Continent.

Henry Eld was a Passed Midshipman in the U. S. S. *Peacock*, one of the vessels of Wilkes's Exploring Expedition in 1838-1842.

The *Narrative* of the Expedition says (Vol. II., p. 292):

On board the *Peacock*, it appears that Passed Midshipmen Eld and Reynolds both saw the land from the masthead, and reported it to Captain Hudson:

On p. 293 of the same volume, Commander Wilkes writes:

Two peaks, in particular, were very distinct (which I have named after those two officers), rising in a conical form;

The construction is peculiar, but the evident intention is to do justice to both men.

The date of the discovery is, according to the *Narrative*, January 16, 1840.

HERR ANSCHÜTZ-KAEMPF has laid before the Vienna Geographical Society a plan for reaching the North Pole in a submarine ship of 800 tons, carrying five persons, who would be able to remain under water for 48 hours and, by the help of compressed oxygen, even a longer time. The ship would be navigated to the edge of the pack-ice and there sunk, to find its way by the compass to the next open space, and then repeat the process.

According to Payer, an opening in the ice is to be found in the European Arctic at about every marine mile; Herr Anschütz-Kaempfe will be satisfied with one in every ten miles.

The thickness of the ice is no great obstacle, for the ship can be sunk to the depth of 160 feet.

If this admirable scheme fails, all is not lost. There remains the ocean floor, on which an automobile might run to the Pole.

M. JULES LECLERCQ, in a report to the Académie Royale de Belgique, examines the question of the nautical school of Sagres, said to have been established by Prince Henry the Navigator, and treated as a legend in a recent memoir by Dr. Jules Mees. Dr. Mees denies also the existence of anything deserving the name of a city on the site of the Villa do Infante.

M. Leclercq calls attention to the fact, apparently overlooked, that the earthquake of 1755 overthrew not only Lisbon but other Portuguese cities, and among them Sagres and Lagos. He notes also the abiding local tradition, and is disposed to treat it with respect.

Mr. R. H. Major, in his *Prince Henry the Navigator*, affirms that the greatest Portuguese historian of our time (a rank conceded to Herculano) expresses a doubt whether it is possible to prove that the school of Sagres ever existed. M. Leclercq, in the note which closes his report, quotes a passage of a letter from a member of the Lisbon Academy to the Portuguese Minister at Brussels to this effect:

It cannot be proved that there existed a school, in the usual and literal sense of the word, or an official naval academy, scientifically and regularly organized, but it is none the less established that the Infant Dom Henry gathered around him at Sagres all the competent men who could give him aid in his geographical, cosmographical and other work. It is to this assemblage of technical elements that the denomination of School of Sagres has always been applied.

The Portuguese Minister, the Count of Tovar, having been asked whether Mr. Major's assertion concerning the Portuguese historian was correct, assured M. Leclercq that if Herculano had made the statement referred to, it was not to be found in his History of Portugal, but must be sought for in some other work.

A REFLECTOR for concentrating the sun's rays to produce steam in order to pump water from a well at South Pasadena, California, is noticed in *Nature*, of April 11th, with this comment:

As the skies of Southern California are remarkably free from clouds, and millions of square miles of arid lands are only awaiting the flow of water to be converted into fertile tracks, the solar motor may provide a practicable means for pumping the water, etc.

The *tracks* are undoubtedly those of the printer, but to whom do the *millions* of square miles in Southern California belong?

NINE YEARS IN THE SEA.—According to the *Sun*, of April 8, a lady of Newark, N. J., more than nine years ago, on the voyage home from England, dropped in mid-Atlantic a bottle containing her address on a telegram and the promise of a reward to the person who should return it. She received it on the 4th of April, with a letter dated Kristiansund, N. Norway, March 22, 1901.

The letter stated that the bottle had been picked up off the coast of the island of Smölen by a fisherman, who would appreciate the promised reward.

The ocean is wide and the nine years' wanderings of the bottle are matter for conjecture; but the incident is not without suggestion as to what has been called the *myth* of the Gulf Stream.

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OBITUARY.

PAUL CHAIX.

Prof. Paul Chaix, a Corresponding Member of this Society for more than forty-seven years, died at his home in Geneva, Switzerland, on the 28th of March, without suffering and in full possession of his rare intellectual gifts, in the ninety-third year of his age.

Paul Chaix was born Oct. 1, 1808, at Crest, in south-eastern France. In 1816 his father removed with his family to Geneva, and there his son received his equally solid and brilliant education.

He adopted the profession of teaching; lived for three years in the family of the Duke of Richmond, and for two years at St. Petersburg with the Gagarine family, and afterwards, at his home in Geneva, directed the education of several princes: Alexander of Prussia, Schwarzburg-Rudolstadt, Lippe-Detmold, Saxe-Altenburg, Mecklemburg-Schwerin, the Duke of Edinburgh, the Princesses Leuchtenberg, and Prince Anhalt.

Prof. Chaix had travelled in many parts of Europe and in Egypt.

He was Instructor in Geography and History at the Industrial College, Professor in the Gymnasium and Honorary Professor of the University of Geneva. All these positions he resigned in 1882, in view of advancing years.

His principal publications are: a Map of Savoy, an Elementary Geography and Atlas, Letters from the Banks of the Nile, a History of South America and the Hydrography of the Arve.

He was a constant contributor to geographical and other reviews, and all his writings bore the stamp of a lucid intelligence, carrying with perfect ease the acquisitions of wide and profound scholarship.

TRANSACTIONS OF THE SOCIETY.

MARCH-APRIL, 1901.

A Regular Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, March 19, 1901, at 8.30 o'clock, P.M.

Vice-President Tiffany in the chair.

The following persons, recommended by the Council, were elected Fellows:

Learned Hand.	Samuel B. Dana.
Dr. Walter G. Chase.	Captain William Crozier.
John T. Williams.	Nelson Robinson.
Edward Sturges.	Dr. H. Ernest Schmid.
John J. Phelps.	Dr. E. Eberhard.
N. Archibald Shaw, Jr.	William Edmond Curtis.
Pinckney F. Green.	E. P. Chapin.
Jesse W. Potts.	John Armstrong Faust.
Cornelius Eldert.	William H. Bliss.
Timothy S. Williams.	James H. Kidder.
John Tatlock, Jr.	William H. Maxwell.
W. F. Wyckoff.	Arthur von Briesen.
Nicholas R. O'Connor.	E. G. Kennedy.
Jonathan Odell Fowler, Jr.	W. A. Clark.
John L. Riker.	C. T. McFarlane.
Alfred Tuckerman.	J. Dyneley Prince.
John G. Neeser.	John H. Barnard.
Lewis A. Eldridge.	Samuel S. Dennis.
Walter C. Taylor.	James Lane Allen.
Frederick E. Willits.	Charles H. Hall.
Lewis S. Thompson.	A. H. Thayer, M.D.
Gouverneur Paulding, II.	George E. Fahys.

The Chairman then introduced Mr. Herbert M. Wilson, of the United States Geological Survey, who delivered a lecture on Examples of Topographic Form in the United States.

On motion the Society adjourned.

A Regular Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, April 16, 1901, at 8.30 o'clock, P.M.

Vice-President Moore in the chair.

The following-named persons were, by the Council, recommended to the Society for election to Fellowship and elected:

Samuel Mather.	Dr. H. Ryniker.
Herman A. Heydt.	George L. Carnegie.
Thomas Sturgis.	Paul Tuckerman.
Edward Winslow Paige.	John Lloyd Thomas.
Paul Outerbridge.	H. A. O'Leary.
Myron A. Lockman.	Julius Robertson.
Le Grand Bouker.	Walter Phelps Dodge.

The Chairman then introduced the speaker of the evening, Prof. Charles L. Bristol, of New York University, who addressed the Society on the Geography of Bermuda.

On motion the Society adjourned.

On the 11th of April a marble bust of Charles P. Daly, the work of Mr. William Rudolf O'Donovan, was delivered to the Council—a gift to the Society from the following gentlemen:

Edward Cooper.	D. O. Mills.
John Greenough.	J. E. Parsons.
John A. Hadden.	Chandler Robbins.
Abram S. Hewitt.	F. Augustus Schermerhorn.
Seth Low.	William C. Schermerhorn.